

**Appendix A: EPA Coal Remining Database - 61 State Data  
Packages**



## **APPENDIX A: EPA Coal Remining Database - 61 State Data Packages**

### **Information Collection**

In an effort to assess the implementation of Best Management Practices during remining and reclamation activities in the Eastern United States, the EPA requested that the Interstate Mining Compact Commission (IMCC) collect information from stakeholder States involved in the IMCC Remining Task Force. The information was to support EPA's efforts to propose a coal remining subcategory under 40 CFR part 434. The goal of the information request was to collect existing information and data for assessment of the benefits, limitations, and feasibility of maintaining or improving environmental quality during and after remining operations. IMCC specifically requested information on abandoned mine land conditions, BMP implementation plans, water quality data, cost information, production statistics, and remining operations.

Six states (Alabama, Kentucky, Pennsylvania, Tennessee, Virginia, and West Virginia) responded to the request for information and submitted a total of 61 individual data packages from remining operations and reclamation projects. The data and information were submitted to EPA and were used to develop this BMP Guidance Manual in support of proposal of a Remining subcategory. Details of the types of information and data collected are provided in Table A.1. Data and information submitted included permits, permit applications, water quality monitoring reports, inspection reports, bore hole analysis logs, and operational information.



**Table A.1: Data Targeted by EPA Information Request**

<b>Water Quality / Environmental Benefits</b>	
	Environmental Assessment Abatement Plans Impact Statistics: <ul style="list-style-type: none"> <li>Abandoned Surface Mine acres affected</li> <li>Abandoned Underground Mine acres affected</li> <li>Abandoned Highwall linear feet affected/removed</li> <li>Pre-existing discharges encountered/affected</li> <li>Stream Miles degraded by AMD (EPA 303(d) list)</li> </ul>
<b>Industry Profile - by State</b>	
	Number of companies Number of mine sites Types of mining activities Production statistics
<b>Permit Applications</b>	
<b>Permits</b>	
<b>Environmental Resources Maps</b>	
<b>Geology Information</b>	
	Overburden Analyses Borehole Analyses
<b>Hydrologic Assessment</b>	
	Chemical Analysis (Background Monitoring Reports - Concentration) (Flow, pH, Conductivity, Temp., Alkalinity, Acidity, Fe, Mn, Al, SO <sub>4</sub> , TSS/TDS)  Ground Water Information Surface Water Information Pre-existing Discharge Information Public Water Supply Information
<b>Operational Information</b>	
	Reclamation/Operation Description and Maps Reclamation Cost Estimate / Time Schedule Identification of Final Grading and Drainage Pattern
<b>Production Statistics</b>	
	Annual and overall coal production (tonnage) Annual and overall profit Number of employees
<b>Cost Information</b>	
	Cost of BMP implementation versus cost of treatment (pre-existing discharges)

<b>Best Management Practices (BMPs) - descriptions/typical combinations</b>	
	Regrading Daylighting Management of toxic and acid forming materials Addition of alkaline materials Hydrologic controls: diversion ditches, mine seals, hydraulic barriers Revegetation Stabilization Application of Biosolids
<b>Remining Plans</b>	
	Identification of Affected Abandoned Mine Areas, Highwalls, and Preexisting Discharges Background History of Preexisting Discharges Baseline Pollution Load Analysis and Data Abatement Plan / BMP Application and Description / BMP Implementation Costs Water Quality Monitoring Program Anticipated Pollution Reduction Benefits - Impact on Water Quality - Benefits Treatment Costs Schedule
<b>Topographic Maps</b>	

## Remining Database

All data submitted for the 61 mining and reclamation operations has been entered into EPA's Remining Database, 1999, which was designed specifically to contain the data and information provided in these data packages. The database design is shown in Figure A-1. The final version of the database (May, 1999) is available on CD-ROM from EPA's Sample Control Center, and can be requested by calling the Sample Control Center at 703/461-2025. The CD-ROM is accompanied by the Coal Remining Database User's Manual and Database Data Element Dictionary.

The Remining Database contains both qualitative and quantitative data. Because not all solicited information was available or applicable to all 61 sites, some database fields are empty. Numeric data is provided in the geology, surface water, ground water, and mine discharge sections of the database and was entered as was reported by the States. The narrative information was taken from the mine site permits, permit applications, abatement plans, or related information.

Figure A.1: EPA Remining Database Design

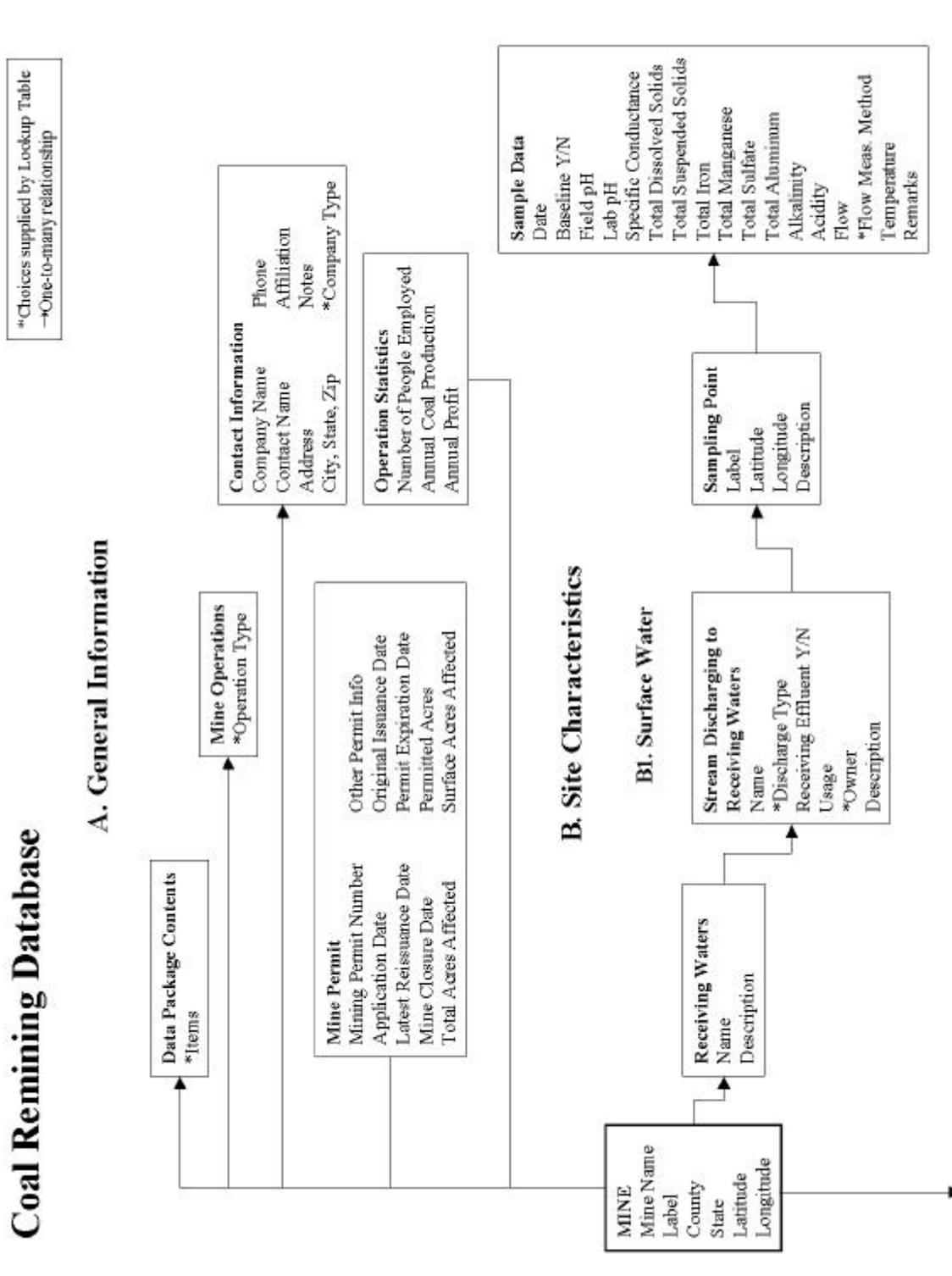


Figure A.1: EPA Remining Database (continued)

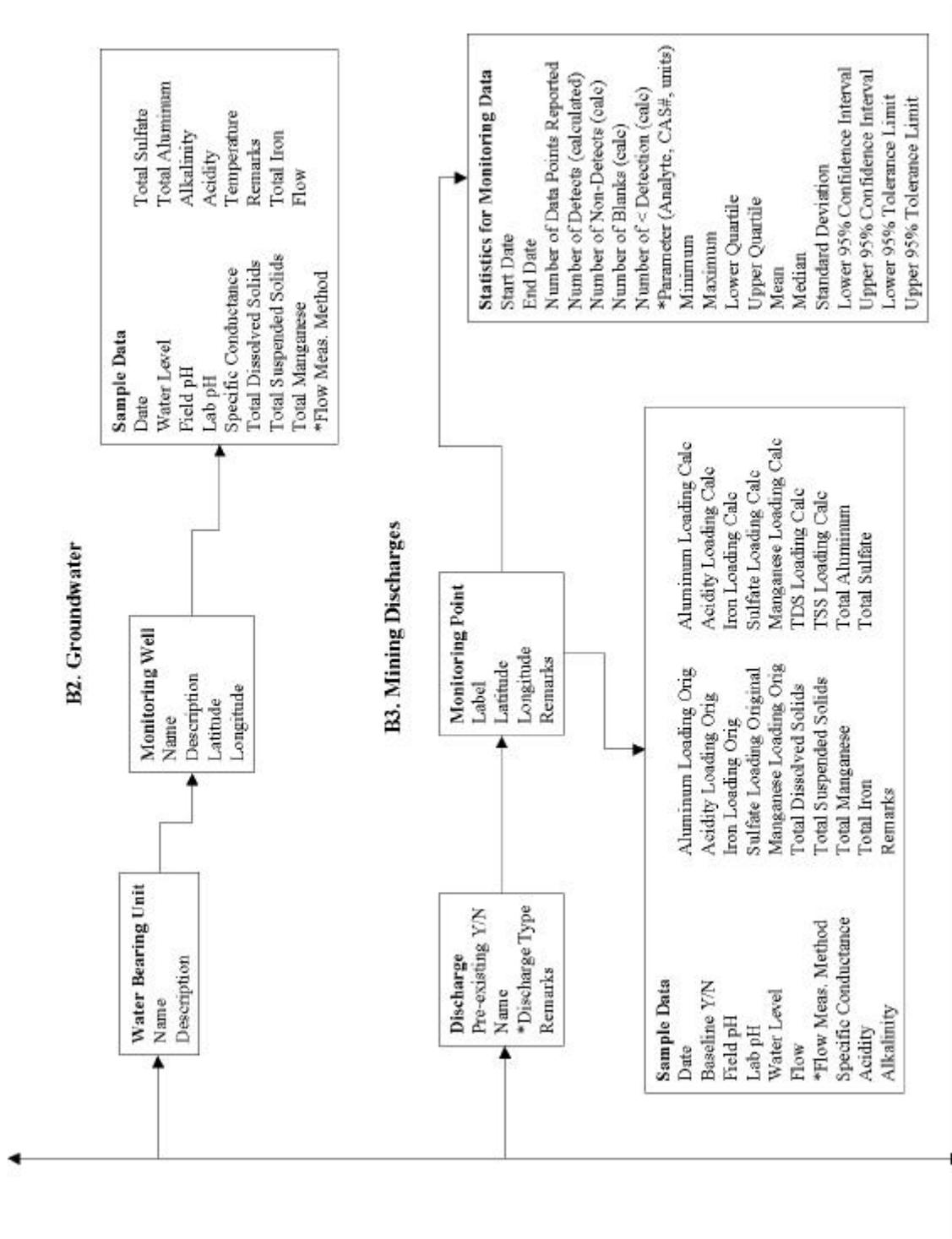
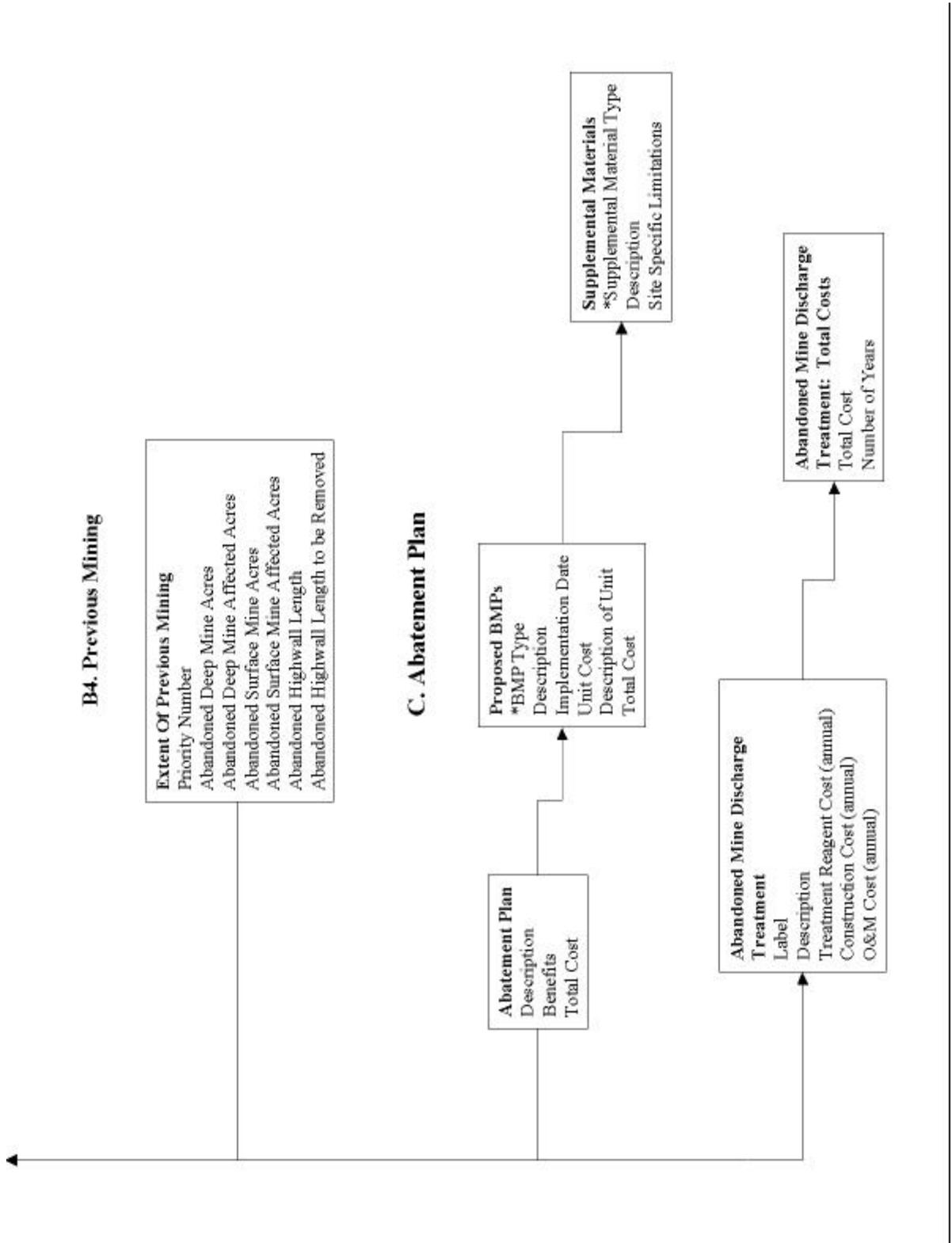


Figure A.1: EPA Remining Database (continued)





## **Information Summary**

A summary of the information is given in the following tables.

- **Table A.2:** According to the information provided by the data packages and subsequent contact responses, 30 of the 61 operations were closed as of the date the data were submitted. Mine closure dates for mines that are known to be closed, are included in Table A.2.
- **Table A.3:** Contains information on the extent and type of abandoned mine land and the extent the abandoned mine land was expected to be affected by remining operations.
- **Table A.4:** Contains the type of mining or reclamation operations and the coal seams mined for each site. In some cases, a remining operation involved reclamation of abandoned spoils piles and no coal seams were mined.
- **Table A.5:** Lists the BMPs implemented during remining or reclamation activities. The BMPs are listed in the order presented in this document with the mine sites that implemented each BMP.
- **Table A.6:** Lists the BMPs implemented during remining or reclamation activities. The BMPs are organized by the mine sites which implemented them.



**Table A.2: Mine Site Status and Permit Information**

<b>Mine ID</b>	<b>Issuance Date</b>	<b>Expiration Date</b>	<b>Mine Closure Date</b>	<b>Rahall Permit</b>
AL(1)	07/05/1983	07/04/2003	Active Site	Yes
AL(2)	08/24/1989	08/23/1994	Early 1991	Yes
AL(3)	09/11/1989	09/10/1999	08/18/1998	Yes
AL(4)	12/06/1989	12/05/1999	Active Site	Yes
AL(5)	03/16/1990	03/15/2000	10/1995	Yes
AL(6)	09/19/1990	09/18/1995	08/1994	Yes
AL(7)	03/06/1991	03/05/1996	07/17/1992	Yes
AL(8)	06/03/1992	06/02/1999	Active Site	Yes
AL(9)	06/09/1992	06/08/1997	03/1994	Yes
AL(10)	03/08/1994	03/07/1999	02/1996	Yes
AL(11)	Unknown	Unknown	Mining Suspended	Yes
AL(12)	07/30/1991	Unknown	12/01/1998	Yes
AL(13)	01/23/1991	Unknown	10/10/1994	Yes
AL(14)	12/08/1986	Unknown	Early 1990	Yes
AL(15)	01/28/1988	01/27/1993	Permitted, but never mined	Yes
AL(16)	Unknown	Unknown	Reclaiming	Yes
KY(1)	07/18/1997	07/18/2002	Active	Yes
KY(2)	09/19/1997	09/19/2002	Active	Yes
KY(3)	08/13/1991	09/13/1994	Shut down 11/1998, may reopen	Yes
KY(4)	04/04/1995	08/31/2002	Active	Yes
PA (1)	04/02/1991	04/02/2001	10/30/1998	Yes
PA(2)	05/23/1989	05/23/1999	Active	Yes
PA(3)	05/25/1990	05/25/1995	06/23/1998	Yes
PA(4)	04/13/1988	04/13/2003	Active	Yes
PA(5)	02/01/1995	02/01/2000	04/09/1998	Yes
PA(6)	04/13/1990	04/13/2000	08/15/1996	Yes
PA(7)	09/15/1989	09/15/1999	05/01/1996	Yes
PA(8)	09/01/1993	09/01/1998	Active	Yes
PA(9)	Unknown	Unknown	Active	Yes
PA(10)	11/06/1990	11/06/1995	11/06/1995	Yes
PA(11)	04/25/1990	04/25/2000	Active	Yes
PA(12)	05/11/1992	05/11/2000	Active	Yes
PA(13)	02/24/1989	06/13/1999	Unknown	Yes
PA(14)	08/24/1987	08/24/2002	Active	Yes
PA(15)	03/15/1985	03/15/2000	Active	Yes
PA(16)	06/01/1992	06/01/2002	Active	Yes
PA(17)	02/12/1990	02/12/2000	Active	Yes
PA(18)	12/12/1996	12/12/2001	Active	Yes
PA(19)	12/23/1997	12/23/2002	Active	Yes
TN(1)	01/24/1992	Unknown	Active	No
TN(2)	07/25/1980	07/25/1981	Bond returned by State, 1984	No

<b>Mine ID</b>	<b>Issuance Date</b>	<b>Expiration Date</b>	<b>Mine Closure Date</b>	<b>Rahall Permit</b>
<b>TN(3)</b>	05/08/1997	Unknown	04/09/1998, Phase I Bond Release Only	No
<b>TN(4)</b>	11/22/1996	06/27/1998	Active	No
<b>TN(5)</b>	12/16/1991	Unknown	12/16/1994, Bond Forfeited	No
<b>VA(1)</b>	12/05/1994	07/24/2002	10/05/1998	No
<b>VA(2)</b>	10/03/1990	Unknown	12/07/1993	No
<b>VA(3)</b>	01/16/1988	Unknown	12/12/1997	No
<b>VA(4)</b>	None	None	Closed	No
<b>VA(5)</b>	None	None	Closed	No
<b>VA(6)</b>	01/16/1992	Unknown	Active	Yes
<b>VA(7)</b>	06/20/1990	Unknown	Active	Yes
<b>VA(8)</b>	09/27/1996	Unknown	Active	Yes
<b>WV(1)</b>	Unknown	Unknown	Active	Yes
<b>WV(2)</b>	10/16/1987	09/14/1992	12/05/1991	No
<b>WV(3)</b>	Unknown	07/14/1999	Active	Yes
<b>WV(4)</b>	02/21/1990	01/16/2003	11/16/1995, Phase I only	No
<b>WV(5)</b>	01/06/1994	01/06/1999	Active	Yes
<b>WV(6)</b>	03/26/1985	01/10/2000	Active	Yes
<b>WV(7)</b>	09/23/1983	09/23/1988	11/26/1991	No
<b>WV(8)</b>	08/05/1993	08/05/1998	Active	Yes
<b>WV(9)</b>	10/01/1981	09/14/1997	03/10/1997	No
<b>WV(10)</b>	03/25/1985	03/25/1990	07/10/1996	No

Table A.3: Extent of Abandoned Mine Lands

Mine ID	ADM <sup>1</sup> (Acres)	Affected ADM (Acres)	ASM <sup>2</sup> (Acres)	Affected ASM (Acres)	AH <sup>3</sup> (feet)	AH Removed (feet)
AL(1)	0	0				
AL(2)	0	0			0	0
AL(3)	0	0				
AL(4)	0	0				
AL(5)						
AL(6)	0	0	21			
AL(7)			64			
AL(8)						
AL(9)	0	0			0	0
AL(10)			18	18		
AL(11)						
AL(12)						
AL(13)						
AL(14)	0	0	9	9	0	0
AL(15)						
AL(16)						
KY(1)	36.1	36.1	186.7	186.7		
KY(2)			246.4	246.4		
KY(3)			181	181		
KY(4)			186.1	186.1		
PA (1)	29.8	3.6	0	0	0	0
PA(2)	56.5	0	50	50	0	0
PA(3)	90	49	69.9	33.8	0	0
PA(4)	81.8	0	43.8	43.8		
PA(5)	0	0	77.4	63.9	1100	1100
PA(6)	28.3	5	24.8	15.5	2600	1700
PA(7)					35; 50	
PA(8)	27.2	27.2	0	0	0	0
PA(9)	128.9	103.5	187.4	187.4	11,788	11,788
PA(10)	0	0	32.2	15.6	2150	1800
PA(11)	66.1	23.7	65	37.8		
PA(12)						
PA(13)						
PA(14)						
PA(15)						
PA(16)	0		311	311		
PA(17)	0	0	729.7	60.6 to 678	61730	10880 to 61730
PA(18)	2725	640	650	500	106,350	52,300
PA(19)	0	0	29.3	3	1450	1450
TN(1)						

Mine ID	ADM <sup>1</sup> (Acres)	Affected ADM (Acres)	ASM <sup>2</sup> (Acres)	Affected ASM (Acres)	AH <sup>3</sup> (feet)	AH Removed (feet)
TN(2)						
TN(3)						
TN(4)						
TN(5)						
VA(1)			265			
VA(2)			37.4			
VA(3)			105			
VA(4)						
VA(5)						
VA(6)	252.19		590	485.19		
VA(7)			1140.25	1140.25		
VA(8)			1440	1440		
WV(1)						
WV(2)						12000
WV(3)						
WV(4)	0	0	67	67	2,400	
WV(5)			92	92		
WV(6)						
WV(7)					13,000	
WV(8)						
WV(9)	94	94	54	54	8400	
WV(10)					17,832	

Note: Blank cells indicate that no mention was made of the existence of that type of abandoned mine land. Zeros are used in the table to show that the mining operator specifically mentioned that the type of abandoned mine land was not present or affected.

<sup>1</sup>Abandoned deep mine

<sup>2</sup>Abandoned surface mine

<sup>3</sup>Abandoned highwall

**Table A.4: Type of Mining and Coal Seams Mined**

<b>Mine ID</b>	<b>Coal Seams Mined</b>	<b>Type of mining</b>
<b>AL(1)</b>	Jefferson and Lick Creek	Surface Mining
<b>AL(2)</b>	Suwanee	Surface Mining
<b>AL(3)</b>	Blue Creek and Jefferson	Surface Mining
<b>AL(4)</b>	Black Creek	Surface Mining
<b>AL(5)</b>	Pratt Group	Surface Mining
<b>AL(6)</b>	Black Creek and Jefferson	Bituminous and Surface Mining
<b>AL(7)</b>	Utley Coal Group	Surface Mining
<b>AL(8)</b>	Mary Lee	Surface Mining
<b>AL(9)</b>	Atna, Cliff, and Underwood	Surface Mining
<b>AL(10)</b>	Guide, Upper Brookwood, Lower Brookwood, Milldale, Carter, and Johnson	Auger Mining and Surface Mining
<b>AL(11)</b>	Unknown	Bituminous and Surface Mining
<b>AL(12)</b>	Pratt, Nickel Plate, and America	Bituminous and Surface Mining
<b>AL(13)</b>	Guide, Brookwood, Upper Milldale, Lower Milldale, and Carter	Surface Mining
<b>AL(14)</b>	None	Bituminous, Surface Mining, and Coal Refuse Disposal
<b>AL(15)</b>	Unknown	Bituminous and Surface Mining
<b>AL(16)</b>	None	Coal Preparation Plant and Surface Mining
<b>KY(1)</b>	None	Coal Refuse Reprocessing, Surface Mining, and Remining
<b>KY(2)</b>	Amburgey, Hazard No. 4, Hazard No.4 Rider, Hz #7, Hz A, and Whitesburg	Surface Mining, Auger Mining, and Remining
<b>KY(3)</b>	USGS #11, USGS #12, and USGS #13	Auger Mining, Refuse Storage, and Surface Mining
<b>KY(4)</b>	USGS #11, USGS #12, USGS #13, USGS #14, and USGS #9	Auger Mining and Surface Mining
<b>PA(1)</b>	Lower Freeport, Upper Freeport, and Upper Freeport Rider	Bituminous, Surface Mining, and Reclamation Operations
<b>PA(2)</b>	USGS #11	Bituminous, Coal Refuse Reprocessing, Fly Ash/Bottom Ash Disposal, and Surface Mining
<b>PA(3)</b>	Pittsburgh	Bituminous and Surface Mining

<b>Mine ID</b>	<b>Coal Seams Mined</b>	<b>Type of mining</b>
PA(4)	Pittsburgh	Bituminous, Coal Refuse Reprocessing, and Remining
PA(5)	Lower Kittanning and Middle Kittanning	Bituminous and Surface Mining
PA(6)	Upper Freeport	Auger Mining, Bituminous, Remining, and Surface Mining
PA(7)	Boney, Lower Freeport, Upper Freeport, and Upper Kittanning	Auger Mining, Coal Refuse Disposal, and Surface Mining
PA(8)	Lower Kittanning and Middle Kittanning,	Surface Mining
PA(9)	Lower Freeport, Lower Kittanning, Middle Kittanning, and Upper Kittanning	Mobile Coal/ Rock Processing, Remining, and Surface Mining
PA(10)	Lower Bakerstown	Remining and Surface Mining
PA(11)	Lower Freeport, Upper Freeport, and Upper Kittanning	Auger Mining, Bituminous, and Surface Mining
PA(12)	Upper Freeport	Auger Mining, Bituminous, Coal Refuse Reprocessing, Fly Ash/Bottom Ash Disposal, and Surface Mining
PA(13)	Lower Freeport, Lower Kittanning, Middle Kittanning, and Upper Kittanning	Auger Mining, Bituminous, and Surface Mining
PA(14)	None	Anthracite, Coal Preparation Plant, Coal Refuse Disposal, Coal Refuse Reprocessing, and Fly Ash/Bottom Ash Disposal
PA(15)	Buck Mountain, Holmes, Mammoth Bottom, Mammoth Top, Orchard, Primrose, Seven Foot Vein, and Skidmore	Anthracite and Surface Mining
PA(16)	Buck Mountain, Holmes, Little Buck Mountain, Mammoth Bottom, Mammoth Top, Seven Foot Vein, and Skidmore	Anthracite, Coal Refuse Disposal, Coal Refuse Reprocessing, and Surface Mining
PA(17)	Bottom Split Mammoth Vein, Diamond Vein, Holmes, Middle Split, Mammoth Vein, Primrose, Seven Foot Vein, and Skidmore	Anthracite, Coal Refuse Disposal, Remining, and Surface Mining
PA(18)	Holmes, Mammoth, and Primrose	Anthracite, Coal Refuse Disposal, Coal Refuse Reprocessing, Fly Ash/Bottom Ash Disposal, Reclamation Operations, and Remining
PA(19)	Lower Kittanning No. 2 and Lower Kittanning No. 3	Remining and Surface Mining
TN(1)	Blue Gem, Coal Creek, and Jellico	Auger Mining and Surface Mining
TN(2)	Sewanee	Surface Mining

<b>Mine ID</b>	<b>Coal Seams Mined</b>	<b>Type of mining</b>
<b>TN(3)</b>	Sewanee	Deep Mining Reclamation and Surface Mining
<b>TN(4)</b>	Sewanee	Auger Mining and Surface Mining
<b>TN(5)</b>	Coal Creek	Reclamation Operations
<b>VA(1)</b>	Clintwood, Lower Bolling, Lower Standiford, Meade Fork, Pinhook, Upper Bolling, and Upper Standiford	Auger Mining, Remining, and Surface Mining
<b>VA(2)</b>	Lower Clintwood, Middle Clintwood, and Upper Clintwood	Auger Mining, Bituminous, Remining, and Surface Mining
<b>VA(3)</b>	Blairs, Clintwood, Dorchester, Lyons, and Norton	Auger Mining, Remining, and Surface Mining
<b>VA(4)</b>	No Seams Mined	Reclamation Operation
<b>VA(5)</b>	No Seams Mined	Reclamation Operation
<b>VA(6)</b>	Bastard Seam, Cedar Grove, Housecoal, Imboden Marker, Jackrock, Low Splint, Lower Kelly, Lower Standiford, Owl, Taggart, Taggart Marker, and Upper Standiford	Bituminous, Remining, and Surface Mining
<b>VA(7)</b>	Bottom Taggart, Cedar Grove, Imboden Marker, Kelly Rider, Lower Kelly, Lower Standiford, Owl, Taggart Marker, Top Taggart, Upper Kelly, and Upper Standiford	Surface Mining
<b>VA(8)</b>	Clintwood	Surface Mining
<b>WV(1)</b>	Clarion, Lower Kittanning, Lower Mercer, Middle Kittanning, and Upper Mercer	Deep Mining Reclamation, Remining, Surface Mining, and Underground Mining
<b>WV(2)</b>	Upper Freeport	Auger Mining and Surface Mining
<b>WV(3)</b>	Bakerstown, Brush Creek, Harlem, and Upper Freeport	Fly Ash/Bottom Ash Disposal, Remining Modification, and Surface Mining
<b>WV(4)</b>	Castle and Sewell	Surface Mining
<b>WV(5)</b>	Upper Freeport	Fly Ash/Bottom Ash Disposal and Surface Mining
<b>WV(6)</b>	Upper Freeport	Fly Ash/Bottom Ash Disposal and Surface Mining
<b>WV(7)</b>	Pittsburgh and Redstone	Surface Mining
<b>WV(8)</b>	Pittsburgh	Deep Mining Reclamation, Fly Ash/Bottom Ash Disposal, and Surface Mining
<b>WV(9)</b>	Big Inch, Little Pittsburgh, and Morantown	Reclamation Operations and Surface Mining
<b>WV(10)</b>	Unknown	Surface Mining



**Table A.5: BMPs and the mines that implemented them**

<b>BMP</b>	<b>Mine ID</b>
<b>Exclusion of Infiltrating Surface Water</b>	
Regrading Abandoned Mine Spoil	All mines
Installation of Surface Water Diversion Ditches	AL(1), AL(3), AL(4), AL(5), AL(11), KY(3), TN(5), VA(1), VA(4), VA(6), WV(1), WV(5), WV(6), WV(8)
Low-Permeability Caps or Seals	VA(5)
Revegetation	All mines
Stream Sealing	None
<b>Control of Infiltrating Ground Water</b>	
Daylighting of Underground Mines	AL(12), KY(2), PA(1), PA(3), PA(6), PA(7), PA(8), PA(9), PA(11), PA(12), PA(17), PA(18), TN(3), VA(1), VA(7), VA(8), WV(1), WV(2)
Sealing and Rerouting of Mine Water from Abandoned Workings	KY(3), KY(4), PA(1), PA(3), PA(10), TN(3), TN(4), VA(6)
Highwall Drains	None
Pit Floor Drains	TN(1), TN(2), TN(3), TN(5), VA(6), VA(8)
Grout Curtains	None
Ground Water Diversion Wells	None
<b>Sediment control</b>	
Site Stabilization	TN(4), VA(6)
Channel, Ditch, and Gully Stabilization	None
Check Dams	None
<b>Geochemical Best Management Practices</b>	
Alkaline Addition	PA(1), PA(2), PA(8), PA(10), PA(11), PA(12), PA(14), PA(17), PA(18), PA(19), TN(3), TN(4), TN(5), WV(1), WV(3), WV(5), WV(6), WV(8)
Special Handling of Acid Forming Materials	AL(1), AL(2), AL(7), AL(10), AL(11), AL(14), KY(1), KY(2), KY(3), KY(4), PA(3), PA(5), PA(6), PA(7), PA(8), PA(11), PA(13), PA(14), PA(19), TN(1), TN(2), TN(4), VA(1), VA(2), VA(3), VA(4), VA(6), VA(7), WV(1), WV(4), WV(5), WV(6), WV(7), WV(8), WV(9)
Bactericides/ Anionic Surfactants	PA(10), VA(4)
<b>Passive Treatment</b>	TN(2), TN(3), TN(5), VA(4), VA(8), WV(5)



**Table A.6: Mines and the BMPs implemented**

<b>Mine ID</b>	<b>BMPs Implemented</b>
<b>AL(1)</b>	Regrading Abandoned Mine Spoil, Revegetation, Installation of Surface Water Diversion Ditches, Special Handling of Acid Forming Materials
<b>AL(2)</b>	Regrading Abandoned Mine Spoil, Revegetation, Special Handling of Acid Forming Materials
<b>AL(3)</b>	Regrading Abandoned Mine Spoil, Revegetation, Installation of Surface Water Diversion Ditches
<b>AL(4)</b>	Regrading Abandoned Mine Spoil, Revegetation, Installation of Surface Water Diversion Ditches
<b>AL(5)</b>	Regrading Abandoned Mine Spoil, Revegetation, Installation of Surface Water Diversion Ditches
<b>AL(6)</b>	Regrading Abandoned Mine Spoil, Revegetation
<b>AL(7)</b>	Regrading Abandoned Mine Spoil, Revegetation, Special Handling of Acid Forming Materials
<b>AL(8)</b>	Regrading Abandoned Mine Spoil, Revegetation
<b>AL(9)</b>	Regrading Abandoned Mine Spoil, Revegetation
<b>AL(10)</b>	Regrading Abandoned Mine Spoil, Revegetation, Special Handling of Acid Forming Materials
<b>AL(11)</b>	Regrading Abandoned Mine Spoil, Revegetation, Installation of Surface Water Diversion Ditches, Special Handling of Acid Forming Materials
<b>AL(12)</b>	Regrading Abandoned Mine Spoil, Revegetation, Daylighting of Underground Mines
<b>AL(13)</b>	Regrading Abandoned Mine Spoil, Revegetation
<b>AL(14)</b>	Regrading Abandoned Mine Spoil, Revegetation, Special Handling of Acid Forming Materials
<b>AL(15)</b>	Regrading Abandoned Mine Spoil, Revegetation
<b>AL(16)</b>	Regrading Abandoned Mine Spoil, Revegetation
<b>KY(1)</b>	Regrading Abandoned Mine Spoil, Revegetation, Special Handling of Acid Forming Materials
<b>KY(2)</b>	Regrading Abandoned Mine Spoil, Revegetation, Special Handling of Acid Forming Materials, Daylighting of Underground Mines
<b>KY(3)</b>	Regrading Abandoned Mine Spoil, Revegetation, Installation of Surface Water Diversion Ditches, Sealing and Rerouting of Mine Water from Abandoned Workings, Special Handling of Acid Forming Materials
<b>KY(4)</b>	Regrading Abandoned Mine Spoil, Revegetation, Sealing and Rerouting of Mine Water from Abandoned Workings, Special Handling of Acid Forming Materials
<b>PA(1)</b>	Regrading Abandoned Mine Spoil, Revegetation, Sealing and Rerouting of Mine Water from Abandoned Workings, Alkaline Addition, Daylighting of Underground Mines
<b>PA(2)</b>	Regrading Abandoned Mine Spoil, Revegetation, Alkaline Addition

<b>Mine ID</b>	<b>BMPs Implemented</b>
<b>PA(3)</b>	Regrading Abandoned Mine Spoil, Revegetation, Sealing and Rerouting of Mine Water from Abandoned Workings, Daylighting of Underground Mines, Special Handling of Acid Forming Materials
<b>PA(4)</b>	Regrading Abandoned Mine Spoil, Revegetation
<b>PA(5)</b>	Regrading Abandoned Mine Spoil, Revegetation, Special Handling of Acid Forming Materials
<b>PA(6)</b>	Regrading Abandoned Mine Spoil, Revegetation, Daylighting of Underground Mines, Special Handling of Acid Forming Materials
<b>PA(7)</b>	Regrading Abandoned Mine Spoil, Revegetation, Daylighting of Underground Mines, Special Handling of Acid Forming Materials
<b>PA(8)</b>	Regrading Abandoned Mine Spoil, Revegetation, Daylighting of Underground Mines, Alkaline Addition, Special Handling of Acid Forming Materials
<b>PA(9)</b>	Regrading Abandoned Mine Spoil, Revegetation, Daylighting of Underground Mines
<b>PA(10)</b>	Regrading Abandoned Mine Spoil, Revegetation, Sealing and Rerouting of Mine Water from Abandoned Workings, Bactericides/ Anionic Surfactants, Alkaline Addition
<b>PA(11)</b>	Regrading Abandoned Mine Spoil, Revegetation, Daylighting of Underground Mines, Alkaline Addition, Special Handling of Acid Forming Materials
<b>PA(12)</b>	Regrading Abandoned Mine Spoil, Revegetation, Daylighting of Underground Mines, Alkaline Addition
<b>PA(13)</b>	Regrading Abandoned Mine Spoil, Revegetation, Special Handling of Acid Forming Materials
<b>PA(14)</b>	Regrading Abandoned Mine Spoil, Revegetation, Alkaline Addition, Special Handling of Acid Forming Materials
<b>PA(15)</b>	Regrading Abandoned Mine Spoil, Revegetation
<b>PA(16)</b>	Regrading Abandoned Mine Spoil, Revegetation
<b>PA(17)</b>	Regrading Abandoned Mine Spoil, Revegetation, Daylighting of Underground Mines, Alkaline Addition
<b>PA(18)</b>	Regrading Abandoned Mine Spoil, Revegetation, Daylighting of Underground Mines, Alkaline Addition
<b>PA(19)</b>	Regrading Abandoned Mine Spoil, Revegetation, Alkaline Addition, Special Handling of Acid Forming Materials
<b>TN(1)</b>	Regrading Abandoned Mine Spoil, Revegetation, Pit Floor Drains, Special Handling of Acid Forming Materials
<b>TN(2)</b>	Regrading Abandoned Mine Spoil, Revegetation, Pit Floor Drains, Special Handling of Acid Forming Materials, Passive Treatment
<b>TN(3)</b>	Regrading Abandoned Mine Spoil, Revegetation, Pit Floor Drains, Daylighting of Underground Mines, Special Handling of Acid Forming Materials, Sealing and Rerouting of Mine Water from Abandoned Workings, Alkaline Addition, Passive Treatment

<b>Mine ID</b>	<b>BMPs Implemented</b>
<b>TN(4)</b>	Regrading Abandoned Mine Spoil, Revegetation, Sealing and Rerouting of Mine Water from Abandoned Workings, Alkaline Addition, Special Handling of Acid Forming Materials, Site Stabilization
<b>TN(5)</b>	Regrading Abandoned Mine Spoil, Revegetation, Installation of Surface Water Diversion, Ditches, Pit Floor Drains, Alkaline Addition, Passive Treatment
<b>VA(1)</b>	Regrading Abandoned Mine Spoil, Revegetation, Daylighting of Underground Mines, Installation of Surface Water Diversion Ditches, Special Handling of Acid Forming Materials
<b>VA(2)</b>	Regrading Abandoned Mine Spoil, Revegetation, Special Handling of Acid Forming Materials
<b>VA(3)</b>	Regrading Abandoned Mine Spoil, Revegetation, Special Handling of Acid Forming Materials
<b>VA(4)</b>	Regrading Abandoned Mine Spoil, Revegetation, Installation of Surface Water Diversion Ditches, Special Handling of Acid Forming Materials, Bactericides/ Anionic Surfactants, Passive Treatment
<b>VA(5)</b>	Regrading Abandoned Mine Spoil, Revegetation, Low-Permeability Caps or Seals
<b>VA(6)</b>	Regrading Abandoned Mine Spoil, Revegetation, Installation of Surface Water Diversion Ditches, Sealing and Rerouting of Mine Water from Abandoned Workings, Special Handling of Acid Forming Materials, Site Stabilization, Pit Floor Drains
<b>VA(7)</b>	Regrading Abandoned Mine Spoil, Revegetation, Daylighting of Underground Mines, Special Handling of Acid Forming Materials
<b>VA(8)</b>	Regrading Abandoned Mine Spoil, Revegetation, Daylighting of Underground Mines, Pit Floor Drains, Passive Treatment
<b>WV(1)</b>	Regrading Abandoned Mine Spoil, Revegetation, Daylighting of Underground Mines, Alkaline Addition, Installation of Surface Water Diversion Ditches, Special Handling of Acid Forming Materials
<b>WV(2)</b>	Regrading Abandoned Mine Spoil, Revegetation, Daylighting of Underground Mines
<b>WV(3)</b>	Regrading Abandoned Mine Spoil, Revegetation, Alkaline Addition
<b>WV(4)</b>	Regrading Abandoned Mine Spoil, Revegetation, Special Handling of Acid Forming Materials
<b>WV(5)</b>	Regrading Abandoned Mine Spoil, Revegetation, Installation of Surface Water Diversion Ditches, Alkaline Addition, Passive Treatment, Special Handling of Acid Forming Materials
<b>WV(6)</b>	Regrading Abandoned Mine Spoil, Revegetation, Installation of Surface Water Diversion Ditches, Alkaline Addition, Special Handling of Acid Forming Materials
<b>WV(7)</b>	Regrading Abandoned Mine Spoil, Revegetation, Special Handling of Acid Forming Materials
<b>WV(8)</b>	Regrading Abandoned Mine Spoil, Revegetation, Installation of Surface Water Diversion Ditches, Alkaline Addition, Special Handling of Acid Forming Materials
<b>WV(9)</b>	Regrading Abandoned Mine Spoil, Revegetation, Special Handling of Acid Forming Materials
<b>WV(10)</b>	Regrading Abandoned Mine Spoil, Revegetation



## **Appendix B: Pennsylvania Remining Site Study**



## **Appendix B: Pennsylvania Remining Site Study**

The Pennsylvania Department of Environmental Protection (PA DEP) has been issuing remining permits since 1984. By 1997, over 260 remining permits had been issued throughout Pennsylvania. This number includes currently active and reclaimed sites. PA DEP routinely reviews self-monitoring reports from these permits to verify that water quality loading limits have not been exceeded. On an annual basis and for all bond release applications, the baseline pollution load is compared to recent pollution load data using a statistical protocol for determining whether there has been a significant increase in the baseline pollution load. If the analysis shows a statistically significant increase in the baseline pollution load, then the operator is required to treat the discharge to at least its original baseline loading rate and reclamation bonds are withheld until the discharge returns to baseline levels or below. Over 10 years of experience shows that baseline exceedences are a very rare occurrence. Of these 260 permits, only 5, or less than 2 percent, have ever registered significant increases from baseline pollution load, requiring long-term treatment. In 1998, PA DEP developed a remining database to determine the success of Pennsylvania's remining program in terms of water quality compliance, and the extent to which remining has reduced pollution loads from pre-existing mine discharges. These evaluations were made by comparing pre-mining and post-mining loads at individual pre-existing discharges for acidity, iron, manganese, aluminum, sulfate, and flow. Additionally, the data were broken down by best management practices (BMPs) that were implemented hydrologically upgradient from each discharge to allow evaluation of the efficiencies of individual and combined BMPs.

The database consists of 241 groundwater discharges (or hydrologic units) from 112 mine sites that were used for statistical analysis. These discharges are hydrologically connected to the mining and reflect the effects of the upgradient remining. Only mines that were Stage II bond released (completely backfilled and revegetated) were included. The sites in the database were further restricted to Pennsylvania's Bituminous Coal Field. This restriction was made because (1) the geology, hydrology, mining methods, and some of the BMPs in the Anthracite Region are substantially different from the Bituminous Region, (2) the Bituminous Region has had a much

greater number of remining permits issued and for a longer period of time, and (3) the Bituminous Region has geology, hydrology, mining methods, and BMPs similar to the rest of the Appalachians. The distribution of mine sites and discharges in the database are depicted by county on Figure B.1. As can be seen, remining sites are spread across the Bituminous Region. The remining sites are surface mines, with the exception of six coal refuse removal sites. There is a total of eight discharges associated with the coal refuse removal sites, compared to 233 discharges associated with surface mining.

The effluent limits which are typically established by best professional judgement (BPJ) analysis are acidity, total iron, total manganese, and total aluminum. Load based BPJ limits are established using baseline data. If water quality concentrations are below best available technology (BAT) limits, then BAT limits are applied. Acidity and sulfate are the most common post-mining pollutants from remining sites, thus their greater representation in the statistical database (Table B.1) than for other pollutants. Iron, manganese, and aluminum to varying degrees meet BAT requirements and therefore do not always undergo a BPJ analysis, thus their less frequent representation in the database.

Acidity has been selected in Pennsylvania for BPJ analysis preferentially to pH because a baseline load can be calculated for acidity, whereas pH does not readily lend itself to calculation of load. Acidity includes "potential" acidity which is latent in "mineral" acidity, a form that is often not represented by pH. Mineral acidity is that portion of acidity that is generated when iron, manganese, aluminum, and some other metals precipitate from solution (see equation 1, Section 2.0). When determining the amount of chemical treatment needed to neutralize acid or to bring the pH up to a certain level, it is acidity that is used to perform these calculations, not pH. Acidity is in units of mg/L calcium carbonate, the same as used for alkalinity.

Figure B.1 Mine Sites and Discharges by County in Pennsylvania

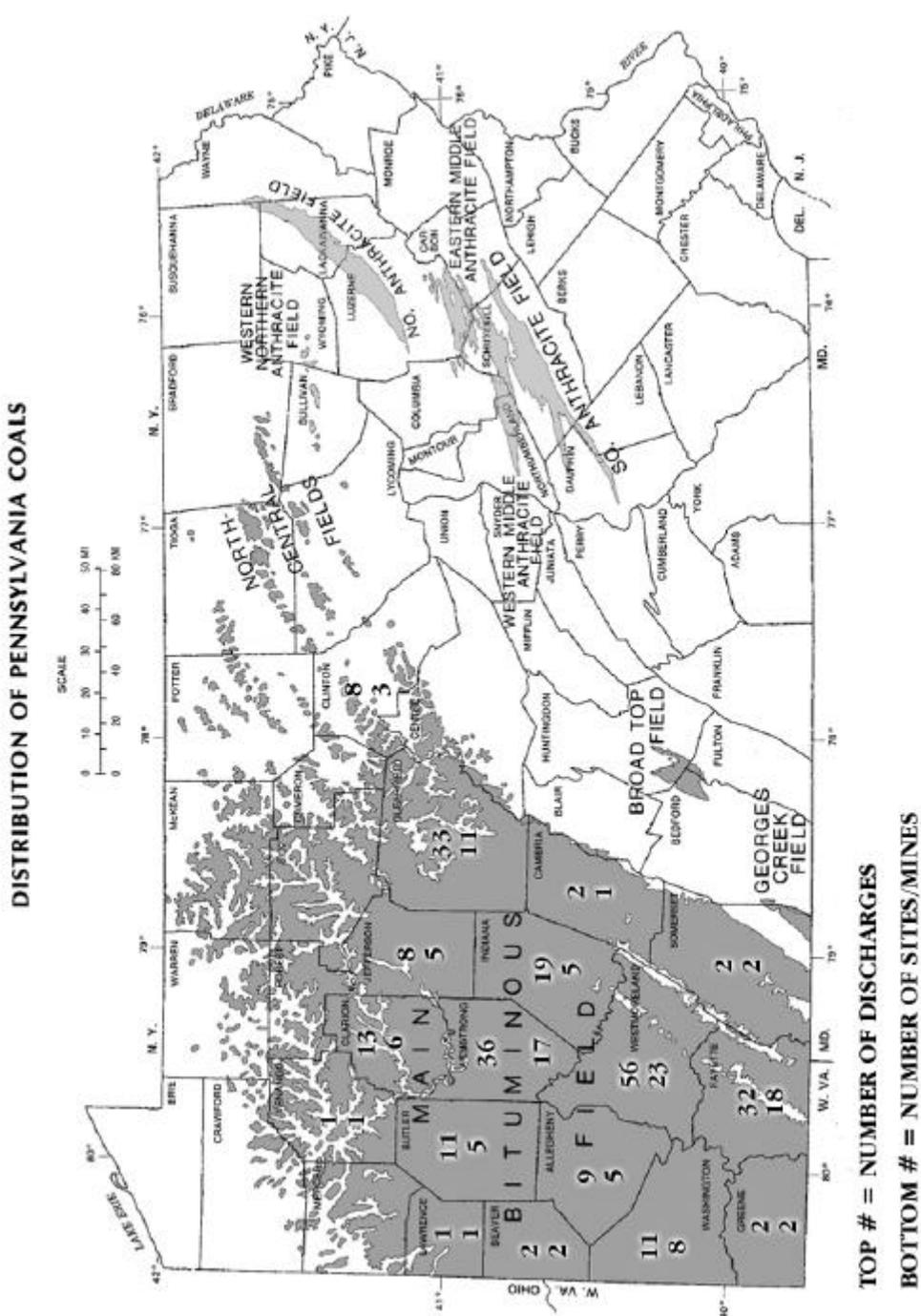


Table B.1 is a compilation of baseline and post-mining median loading for acidity, iron, manganese, aluminum, sulfate, and flow for each discharge, and a sum of the total change in pollution load for each water quality parameter. From left to right, Table B.1 shows monitoring point ID (listed by permit number), permit baseline year (pre-mining data), review year (post-mining data), baseline median load, post-mining median load, percent change in median, baseline upper confidence interval, baseline lower confidence interval, post-mining upper confidence interval, post-mining lower confidence interval, and "evaluation." The statistical summaries for baseline and post-mining loads typically include 12 monthly samples. The confidence intervals give the range of values around the median in which the true population median occurs with a 95% probability. Thus, a comparison between baseline and post-mining confidence intervals indicates whether or not there has been a statistically significant change in water quality. The four evaluation categories are no significant difference, significantly better, significantly worse and eliminated.

- The eliminated category occurs where the post-mining upper confidence interval is zero lbs/day.
- Significantly better occurs where the post-mining upper confidence limit is less than the baseline lower confidence limit.
- Significantly worse occurs where the post-mining lower confidence limit is higher than the baseline upper confidence limit.
- No significant difference occurs where the confidence intervals overlap.

**Table B.1: Summary Statistics of Baseline and Post-Mining Loadings, by Parameter**

- 1= Discharge Significantly Worsened  
 2= No Significant Difference in Discharge  
 3= Discharge Significantly Better  
 4= Discharge Eliminated

Permit ID	Monitoring Point ID	Permit Baseline Year	Review Year	Baseline Median	Post-Mining Median	% Change In Median	Baseline Upper Limit	Baseline Lower Limit	Post-Mining Upper Limit	Post-Mining Lower Limit	Evaluation
<b>Acidity</b>											
Allegheny-1	10	1986	1995	26.81	66.8	149.16%	34.87	18.71	105.34	28.26	2
	2	1986	1995	18.01	2.34	-87.01%	21.25	14.76	2.92	1.76	3
Allegheny-2	S-6	1989	1998	5.83	6.04	3.60%	12.43	-0.77	8.54	3.55	2
	S-7	1989	1989	554.92	0	-100.00%	844.09	265.74	0	0	4
Allegheny-3	d-1p	1991	1998	4.18	1.3	-68.90%	5.04	3.33	1.96	0.64	3
Allegheny-4	BS12	1991	1995	196.4	10.07	-94.87%	209.51	183.29	22.36	-2.22	3
	MD1	1991	1995	119.48	22.44	-81.22%	139.22	99.73	37.96	6.93	3
	MD2	1991	1995	14.85	0	-100.00%	26.68	3.02	0.19	-0.19	3
Allegheny-5	MP-2	1993	1995	8.17	1.33	-83.72%	15.64	0.7	2.52	0.14	2
Armstrong-1	1A	1984	1990	2.04	1.57	-23.04%	3.28	0.79	3.5	-0.37	2
Armstrong-2	D-1	1986	1995	7.5	5.65	-24.67%	17.71	-2.71	9.21	2.09	2
	D-112	1986	1995	0.42	0.75	78.57%	1.05	-0.21	1.2	0.3	2
	D-4	1986	1995	6.83	9.91	45.10%	11.34	2.32	20.45	-0.63	2
Armstrong-3	w-1A	1986	1992	11.65	9.38	-19.48%	15.64	7.65	12.72	6.02	2
	w-2A	1986	1992	11.12	37.5	237.23%	16.24	5.98	57.3	16.3	1
	w-3A	1986	1992	0.72	0.24	-66.67%	1.57	-0.14	0.28	0.19	2
Armstrong-4	GK-13	1987	1993	0.54	0.2	-62.96%	0.75	0.31	0.46	-0.07	2
	GK-17	1987	1988	0	0.01	N/A	0.01	0	0.03	0	2
Armstrong-5	MP-2	1988	1993	4.27	0	-100.00%	6.28	2.26	0	0	4
Armstrong-7	MP14	1988	1997	1.54	2.5	62.34%	2.72	0.36	3.2	1.8	2
	MP15	1988	1997	11.01	1.42	-87.10%	18.7	3.32	6.08	-3.25	2
	MP17	1988	1997	0.79	12.43	1473.42%	5.46	-3.89	20.58	4.27	2
	MP21	1988	1997	0.04	0.2	400.00%	0.15	-0.06	0.84	-0.45	2
	MP22	1988	1997	0.1	1.72	1620.00%	0.75	-0.55	6.64	-3.22	2
	MP23	1988	1997	13.72	9.41	-31.41%	21.27	6.18	21.87	-3.07	2
	MP24	1988	1997	1.2	1.25	4.17%	2.02	0.38	2.09	0.41	2
Armstrong-8	c3-a	1988	1998	13.97	0	-100.00%	24.98	2.96	0	0	4
	md-2	1988	1998	1.85	4.76	157.30%	3.63	0.06	7.13	2.39	2
Armstrong-9	HU1	1988	1998	19.56	22.82	16.67%	28.78	10.35	34.62	11.01	2
Armstrong-10	C-11	1989	1995	2.9	1.66	-42.76%	3.44	2.36	2.54	0.77	2
	S-20	1989	1995	47.1	50.13	6.43%	54.02	40.18	61.63	38.63	2
Armstrong-11	HU1	1990	1997	3.02	0	-100.00%	6.69	-0.65	0	0	4

Permit ID	Monitoring Point ID	Permit Baseline Year	Review Year	Baseline Median	Post-Mining Median	% Change In Median	Baseline Upper Limit	Baseline Lower Limit	Post-Mining Upper Limit	Post-Mining Lower Limit	Evaluation
Armstrong-12	mp2	1991	1995	19.73	0.5	-97.47%	33.38	6.09	0.79	0.21	3
	mph	1991	1995	3.92	1.09	-72.19%	14.64	-6.8	1.64	0.54	2
Armstrong-13	41	1990	1995	9.17	0	-100.00%	12.13	6.2	0.02	-0.02	3
	Unit 2	1990	1995	185.99	3.32	-98.21%	212.48	159.5	5.43	1.2	3
Armstrong-14	1	1991	1993	2.38	0	-100.00%	4.82	-0.07	0	0	4
Armstrong-15	V2	1992	1997	32.79	10.96	-66.58%	42.53	23.05	22.33	-0.41	3
Armstrong-16	HU1	1993	1998	0.07	0	-100.00%	0.57	-0.43	0	0	4
Armstrong-17	HU1	1994	1998	0.39	0.17	-56.41%	0.63	0.15	0.4	-0.05	2
Armstrong-18	D1	1994	1998	0.26	0	-100.00%	0.37	0.14	0.01	-0.01	3
Beaver-1	S-10	1988	1995	4.84	0.43	-91.12%	6.67	3.01	3.35	-2.49	2
Butler-1	5W	1986	1991	1.71	1.95	14.04%	6.77	-3.35	3.55	0.35	2
Butler-2	2W	1984	1989	0.11	0	-100.00%	0.36	-0.14	0	0	4
	5AW	1984	1989	0.17	0.28	64.71%	0.66	-0.32	0.7	-0.14	2
	8W	1984	1989	0.94	0.19	-79.79%	1.55	0.33	0.36	0.03	2
Butler-3	S-116	86	1994	29.85	7.45	-75.04%	35.8	23.9	12.66	2.24	3
	S-13	86	1994	5.34	0	-100.00%	7.52	3.16	0	0	4
	S-200	86	1994	0.85	0	-100.00%	2.33	-0.63	0	0	4
	S-91	86	1994	3.59	0	-100.00%	5.31	1.87	0	0	4
	S-95/96	86	1994	1.7	0	-100.00%	3.01	0.39	1.62	-1.62	2
Butler-4	DR2	1991	1998	17.62	0	-98.58%	22.9	12.34	0	0	4
Butler-5	1	1991	1998	50.75	20.95	-58.72%	62.77	38.72	70.79	-28.89	2
Cambria-1	MP 9	1990	1995	3.49	0.03	-99.14%	4.63	2.35	0.06	0	3
	MP 13	1990	1995	6.65	0	-100.00%	8.71	4.58	0	0	4
Clarion-1	SP-1	1985	1995	192.07	83.01	-56.78%	244.57	139.57	100.01	66.01	3
	SP-28	1985	1995	31.73	12.22	-61.49%	44.73	18.73	16.4	8.05	3
	SP-5	1985	1995	4.32	0	-100.00%	5.81	2.83	0.27	-0.27	3
	SP-6	1985	1995	75	0	-100.00%	99.91	50.09	0	0	4
Clarion-2	1	1986	1989	0.19	0.401	111.05%	0.35	0.03	1.01	-0.2	2
Clarion-3	RH-78	1990	1994	4.95	0	-100.00%	5.81	4.1	0	0	4
	RH-79	1990	1994	3.91	0	-100.00%	4.71	3.11	0	0	4
	RH-82	1990	1994	2.48	0.05	-97.98%	3.08	1.87	0.1	-0.01	3
	RH-84	1990	1994	1.44	0.58	-59.72%	1.82	1.07	1.53	-0.37	2
	RH-91	1990	1994	0.07	0	-100.00%	0.13	0.02	0.02	-0.02	2
	RH-93	1990	1994	0.17	0.01	-94.12%	0.27	0.08	0.02	0	3
	RH-94	1990	1994	1.56	0	-100.00%	1.82	1.3	0	0	4
	RH-96	1990	1994	4.81	0	-100.00%	8.15	1.46	0	0	4
Clarion-4	1	1990	1996	0.47	0	-100.00%	0.62	0.32	0	0	4
	2	1990	1996	0.84	0.13	-84.52%	1.07	0.61	0.25	0.02	3

Permit ID	Monitoring Point ID	Permit Baseline Year	Review Year	Baseline Median	Post-Mining Median	% Change In Median	Baseline Upper Limit	Baseline Lower Limit	Post-Mining Upper Limit	Post-Mining Lower Limit	Evaluation
Clarion-5	DR-1	1990	1992	17.6	39.67	125.40%	29.46	10.52	73.23	6.11	2
Clarion-6	1	1992	1998	0.11	0	-100.00%	0.22	0	0	0	4
	2	1992	1998	0.01	0	-100.00%	0.06	-0.04	0	0	4
	3	1992	1998	0.66	0	-100.00%	1.22	0.09	0	0	4
Clearfield-1	unit 1	1985	1998	230.02	71.33	-68.99%	289.12	170.92	107.81	34.85	3
Clearfield-2	W10	1985	1998	23.08	23.6	2.25%	38.1	8.04	50.89	-3.69	2
	W42	1985	1998	31.27	47.17	50.85%	48.42	14.11	73.56	20.78	2
	W43	1985	1998	69.05	125.32	81.49%	111.18	26.91	215.63	35.02	2
	W44	1985	1998	36.61	47.08	28.60%	61.14	12.06	70.36	23.8	2
Clearfield-3	SF-1	1986	1998	0.42	0.11	-73.81%	0.59	0.24	0.18	0.03	3
	SF10	1986	1998	2.15	0.03	-98.60%	3.69	0.59	0.07	0	3
	SF4	1986	1998	0.14	0.06	-57.14%	0.25	0.02	0.13	-0.01	2
	SF6	1986	1998	0.59	0.49	-16.95%	9.14	-7.97	0.98	0.01	2
	SF61	1986	1998	8.47	1.06	-87.49%	14.84	2.08	6.53	-4.42	2
Clearfield-4	tk-18	1985	1997	35.59	42.44	19.25%	48.81	22.37	51.62	33.26	2
	tk-21	1985	1997	18.3	1.65	-90.98%	29.08	7.52	6.35	-3.06	3
	TK-3	1985	1997	38.46	29.6	-23.04%	42.63	34.29	38.05	21.16	2
	tk-37	1985	1997	7.19	5.33	-25.87%	11.29	3.09	6.67	3.98	2
	tk-4	1985	1997	1.28	0.41	-67.97%	1.77	0.79	0.52	0.3	3
	tk-7	1985	1997	4.33	0	-100.00%	5.47	3.19	0.01	-0.01	3
Clearfield-5	SV-5	1988	1992	8.15	12	47.24%	10.56	5.73	15	10	2
	SV-8	1988	1992	12.78	11.56	-9.55%	19.68	5.87	15.02	8.1	2
Clearfield-6	R-3	1988	1995	10.58	0.065	-99.39%	15.01	6.14	0.4	-0.27	3
	R-5	1988	1995	4.19	1.4	-66.59%	6.47	1.9	2.09	0.71	2
	R-8	1988	1995	12.18	0	-100.00%	19.48	4.87	0	0	4
Clearfield-7	12	1989	1997	1.35	0.97	-28.15%	2.28	0.41	1.68	0.26	2
	13	1989	1997	209.67	173.81	-17.10%	269.13	150.12	203.94	143.68	2
Clearfield-8	TK4	1990	1996	0.92	0.4	-56.52%	1.24	0.6	0.54	0.31	3
	TK7	1990	1996	1.44	0	-100.00%	2.1	0.78	0.01	-0.01	3
Clearfield-9	1	1990	1994	18.03	0	-100.00%	29.12	6.94	0	0	4
	2	1990	1994	0.19	0	-100.00%	0.75	-0.87	0	0	4
Clearfield-10	HU 1	1992	1998	4.85	4.34	-10.52%	8.22	1.48	6.86	1.82	2
	HU 2	1992	1998	1.5	0.75	-50.00%	1.99	1	1.15	0.35	2
	HU 3	1992	1998	8.24	3.17	-61.53%	10.62	5.86	4.39	1.95	3
Clearfield-11	subf-a	1993	1994	5.84	6.5	11.30%	8.95	2.74	8.53	4.46	2
	subf-b	1993	1994	0.4	0.13	-67.50%	0.67	0.14	0.35	0	2
	subf-c	1993	1994	8.57	2.85	-66.74%	10.88	6.26	5.09	0.61	3
Clinton-1	96	1981	1995	11.12	0	-100.00%	18.63	3.6	0	0	4
	97	1981	1995	11.12	0	-100.00%	18.63	3.6	0	0	4
	13	1981	1995	20.49	0	-100.00%	31.44	9.53	0	0	4
	15A	1981	1995	8.11	0	-100.00%	13.64	2.58	0	0	4
	SNW 1A	1981	1996	41.22	32.27	-21.71%	61.34	21.06	51.09	13.5	2
Clinton-2	GR-9	1988	1993	21.45	2.59	-87.93%	44.59	-1.69	24.17	-18.99	2
Clinton-3	SEH-31	1990	1993	19.94	6.21	-68.86%	25.79	14.09	-6.02	18.44	3
	SHE-30	1990	1993	0.95	5.1	436.84%	1.85	0.05	7.09	3.1	1
Fayette-1	mp-4	1989	1993	12.9	4.88	-62.17%	16.95	8.84	5.12	4.64	3
	mp-5	1989	1993	14.95	0	-100.00%	20.33	9.56	0	0	4
	mp-6	1989	1993	2.24	0	-100.00%	4.79	-0.32	0	0	4
	mp-8	1989	1993	15.11	1.17	-92.26%	19.63	10.58	1.23	1.11	3

Permit ID	Monitoring Point ID	Permit Baseline Year	Review Year	Baseline Median	Post-Mining Median	% Change In Median	Baseline Upper Limit	Baseline Lower Limit	Post-Mining Upper Limit	Post-Mining Lower Limit	Evaluation
Fayette-2	HU-1	1984	1992	622.81	167.96	-73.03%	919.04	326.57	185.12	150.79	3
Fayette-3	MS100	1988	1995	38.94	0.3	-99.23%	54.78	23.1	0.72	-0.12	3
Fayette-4	MP6	1988	1993	2.97	3.09	4.04%	6.72	-0.79	11.17	-4.98	2
Fayette-5	mp-4	1988	1998	1408.74	932.4	-33.81%	1723	1094	1063	801	3
	mp-hua	1988	1998	1441	1039	-27.9%	2218	663	1384	694	2
Fayette-6	MP-1	1988	1994	170.29	15.73	-90.76%	252.6	87.98	44.07	-12.61	3
Fayette-7	MP48	1989	1996	418.49	317.51	-24.13%	546.47	290.51	505.22	129.79	2
	MP49	1989	1996	92.84	135.78	46.25%	134.95	50.72	177.84	93.72	2
Fayette-8	MP-15	1988	1994	142.71	64.08	-55.10%	170.13	115.29	193.76	-65.6	2
Fayette-9	MP-28	1990	1998	149.83	123.78	-17.39%	247.01	52.65	200.72	46.85	2
Fayette-10	mp-1	1989	1992	161.85	38.45	-76.24%	204.87	118.84	62.16	14.74	3
	mp-11	1989	1992	30.61	15.88	-48.12%	43.13	18.09	34.52	-2.77	2
	mp-2	1989	1992	4.23	8.51	101.18%	5.87	2.59	12.05	4.98	2
Fayette-11	mp 29	1991	1998	30.78	28.22	-8.32%	71.31	-9.75	45.92	10.52	2
Fayette-12	MP68	1991	1997	2.46	3.75	52.44%	4.91	0.01	6.47	1.03	2
Fayette-13	D5	1991	1995	12.85	9.84	-23.42%	17.64	8.05	13.08	6.59	2
Fayette-14	mp-19	1991	1998	5.84	0	-100.00%	12.46	-0.77	0	0	4
	mp-57	1991	1998	29.06	3.33	-88.54%	58.11	0	8.56	-1.89	2
	mp-60	1991	1998	79.71	32.07	-59.77%	130.24	29.18	71	-6.86	2
	mp56	1991	1998	54.62	511.67	836.78%	175.15	-65.91	918.61	104.72	2
Fayette-15	MD1/MD2	1991	1995	1.68	0.04	-97.62%	5.61	-2.26	0.1	-0.03	2
	MD8/BS29	1991	1995	14.59	1.06	-92.73%	36.39	-7.21	1.31	0.8	2
Fayette-16	MP-42	1994	1996	3.8	0.65	-82.89%	22.71	-15.12	11.82	-10.52	2
	MP-8	1994	1996	92.32	32.94	-64.32%	132.84	51.79	78.99	-13.11	2
Greene-1	MP-51	1987	1988	16.35	0	-100.00%	22.77	9.93	0	0	4
Greene-2	hu1	1989	1994	106.48	19.65	-81.55%	186.91	26.06	34.31	4.99	2
Indiana-1	H	1988	1995	150.24	173.09	15.21%	225.69	74.77	222.89	123.29	2
	J	1988	1995	52.76	55.06	4.36%	90.82	14.69	113.87	-3.76	2
	K	1988	1995	19.6	23.88	21.84%	24.89	14.3	38.6	9.15	2
	L	1988	1995	23.93	0.42	-98.24%	31.92	15.93	12.56	-11.73	3
	M	1988	1995	11.58	7.4	-36.10%	25.25	-2.1	16.13	-1.33	2
	N	1988	1995	3.98	0.56	-85.93%	10.29	-2.34	1.01	0.11	2
	O	1988	1995	0	0	N/A	0.01	0	0	0	4
Indiana-2	MP-5	1988	1997	209.22	116.77	-44.19%	348.3	70.12	200.3	33.25	2
	MP-15	1988	1997	6.09	0.28	-95.40%	9.93	2.23	0.56	0	3
Indiana-3	1 (A)	1992	1998	1.34	0	-100.00%	2.62	0.07	0.01	-0.01	3
	2 (B)	1992	1998	147.38	15.38	-89.56%	180.55	114.2	23.62	7.13	3
	3 (C)	1992	1996	171.92	83.29	-51.55%	213.48	130.36	234.27	-67.69	2
	4 (D)	1992	1998	70.4	7.64	-89.15%	87.85	52.95	16.45	-1.17	3
Indiana-4	1	1992	1998	6.12	6.16	0.65%	7.18	5.07	8.85	3.47	2
	MP-51	1992	1998	15.39	0	-100.00%	19	11.78	0	0	4
	MP-52	1992	1998	1.2	0.54	-55.00%	6.24	-3.84	0.86	0.22	2
Jefferson-1	1	1984	1993	14.28	66.62	366.53%	29.91	-1.35	154.42	-21.17	2
Jefferson-2	MP-13	1986	1996	1.6	2.38	48.75%	2.14	1.06	4.87	-0.11	2
Jefferson-3	HU-1	1989	1992	0.01	0	-100.00%	0.09	-0.07	0	0	4
Jefferson-4	HU-1	1989	1996	48.11	1.09	-97.73%	56.81	39.41	4.25	-2.07	3
Jefferson-5	MP-33	1989	1998	3.97	3.77	-5.04	6.6	1.34	5.43	2.1	2
	MP-8B	1989	1998	152.39	99.52	-34.69%	187.55	117.23	162.98	36.06	2

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Jefferson-6	S-25	1993	1998	1.67	0.11	-93.41%	2.86	0.48	0.18	0.04	3
	s-34	1993	1998	1.8	1.05	-41.67%	2.93	1.1	2.89	-0.89	2
Jefferson-7	MP-1	1991	1995	0.36	0	-100.00%	0.52	0.19	0	0	4
Lawrence-1	1	1992	1998	3.47	0	-100.00%	4.98	1.96	0	0	4
Somerset-1	SP16	1989	1998	20.18	22.12	9.61%	26	14.36	24.09	20.14	2
Venango-1	1	1989	1994	20.94	11.49	-45.13%	39.36	11.14	21.25	1.72	2
Wash. -1	HU1	1986	1993	295.51	39.39	-86.67%	388.62	202.78	57.28	21.49	3
Wash. -2	A	1985	1998	115.68	0.1	-99.91%	160.2	71.16	0.17	0.03	3
Wash. -3	CV103	1985	1998	9411.66	1324.6	-85.93%	11146.92	7676.39	2020.61	628.6	3
	CV4	1985	1998	1350.09	118.4	-91.23%	1585.7	1114.47	142.12	94.67	3
Wash. -4	MP-1	1989	1998	652.11	6.03	-99.08%	1044.41	259.8	8.44	3.61	3
	MP-2	1989	1998	535.6	0	-100.00%	747.88	322.24	0	0	4
Wash. -5	d-1	1987	1996	4.18	0.79	-81.10%	5.04	3.33	1.71	-0.14	3
Wash. -7	se1a	1995	1998	1.1	0	-100.00%	3.57	-1.38	0	0	4
West-moreland-1	MP10	1984	1993	30.64	27.71	-9.56%	39.11	22.16	47.49	7.91	2
	MP7	1984	1993	30.28	45.08	48.88%	40.96	19.59	67.15	23	2
	MP9	1984	1993	0.21	0.69	228.57%	0.48	-0.05	1.29	0.08	2
West-moreland-2	S8	1985	1994	30.84	7.78	-74.77%	43.85	17.83	17.79	-2.23	3
West-moreland-3	CP2	1986	1990	11.77	4.52	-61.60%	16.98	6.55	6.84	2.19	2
	Culvert	1986	1986	3.58	0.22	-93.85%	6.03	1.12	0.54	-0.11	3
West-moreland-4	MD-1	1986	1990	3.74	5.41	44.65%	25.67	-18.2	18.86	-8.05	2
	MD-3	1986	1990	5.94	0	-100.00%	54.68	-42.8	0.12	-0.13	2
	MD-4	1986	1990	16.99	9.68	-43.03%	41.96	-7.98	13.7	5.64	2
	MD-6	1986	1990	167.25	0.97	-99.42%	443.44	-108.96	0.98	0.96	2
	MD-7	1986	1990	125.77	28.78	-77.12%	250.89	0.63	50.23	7.32	2
West-moreland-5	HU-1	1986	1996	570.84	401.91	-29.59%	972.94	168.74	602.25	201.56	2
West-moreland-6	M	1985	1993	8.21	7.02	-14.49%	14.86	1.55	9.76	4.28	2
	N	1985	1993	2.13	0.57	-73.24%	5.18	0	2.64	-1.52	2
West-moreland-7	MP-3	1986	1991	9.76	0.92	-90.57%	10.48	9.03	1.49	0.36	3
	MP-4	1986	1991	284	365.04	28.54%	569.5	-1.5	608.76	121.33	2
West-moreland-8	MP-4	1987	1998	12.15	0	-100.00%	18.04	6.26	0	0	4
West-moreland-9	MP-46	1987	1993	590.44	525.86	-10.94%	748.65	432.22	762.95	288.77	2
	MP-47	1987	1993	469.53	663.91	41.40%	687.42	251.63	1230.27	97.53	2
	MP-51	1987	1993	8.1	18.78	131.85%	11.25	4.94	30.47	7.08	2
	MP-52	1987	1993	2.96	2.26	-23.65%	3.96	1.95	9.6	-5.08	2
	MP-56	1987	1993	6.34	6.06	-4.42%	9.69	2.98	10.54	1.57	2
	MP-60	1987	1993	6.36	2.69	-57.70%	9.68	3.02	6.94	-1.58	2
	MP-A	1987	1995	5.95	1.4	-76.47%	12.75	-0.87	2.06	0.75	2

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West-moreland-10	MP12	1988	1995	37.68	0.76	-97.98%	93.48	-18.13	1.11	0.41	2
West-moreland-11	MP3	1988	1992	1245.66	842.7	-32.35%	1413.04	1078.28	1042.3	643.1	3
West-moreland-12	MP-1	1988	1995	439.13	0	-100.00%	594.61	283.65	0	0	4
	MP-2	1988	1995	8.55	7.76	-9.24%	14.41	2.68	14.77	0.75	2
	MP-3	1988	1995	41.79	30.24	-27.64%	72.07	11.51	36.04	24.44	2
	MP-4	1988	1995	81.63	0.37	-99.55%	129.46	33.8	3.54	-2.79	3
	MP-5	1988	1995	34.39	83.86	143.85%	73.68	-4.91	131.99	34.73	2
	MP-6	1988	1995	59.26	106.05	78.96%	88.79	29.73	222.74	-10.64	2
	MP-A	1988	1995	55.37	42.1	-23.97%	92.66	16.08	67.76	16.43	2
	MP-B	1988	1995	34.61	18.24	-47.30%	51.68	17.54	26.01	10.48	2
	MP-C	1988	1995	12.69	20.34	60.28%	28.11	-2.73	28.62	12.06	2
West-moreland-13	mp-a	1989	1993	5.89	3.17	-46.18%	7.44	4.35	7.38	-1.06	2
	mp-b	1989	1993	48.24	18.1	-62.48%	58.58	37.89	31.2	5	3
West-moreland-14	HU-1	1988	1995	32.71	10.66	-67.41%	38.39	27.02	15.82	5.49	3
West-moreland-15	SLK-GW-27	1994	1999	5.87	0.9	-84.67%	6.99	4.75	1.56	0.25	3
West-moreland-16	mp-8	1990	1995	21.31	18.58	-12.81%	26.52	16.09	28.22	8.97	2
West-moreland-17	SW18	1989	1993	1.23	0	-100.00%	1.4	1.05	0	0	4
West-moreland-18	1	1989	1995	0.85	0.67	-21.18%	0.99	0.71	0.99	0.35	2
	2	1989	1995	5.3	5.1	-3.77%	7.71	2.89	11.45	-1.25	2
	3	1989	1995	4.27	7.17	67.92%	6.49	2.05	15.75	-1.41	2
West-moreland-19	MP16	1993	1999	0.75	0.49	-34.67%	0.95	0.55	0.65	0.32	2
	MP5	1993	1999	1.1	0.02	-98.18%	1.58	0.63	0.09	-0.05	3
	MP6	1993	1999	2.2	1.74	-20.91%	2.82	1.58	2.79	0.69	2
West-moreland-20	mp-7	1991	1998	1.02	0	-100.00%	1.71	0.34	0.07	-0.07	3
West-moreland-21	MP3	1992	1997	4.44	0.88	-80.18%	6.05	2.83	1.69	0.06	3

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West-moreland-22	103	1994	1998	1.44	0	-100.00%	1.76	1.13	0	0	4
	69	1994	1998	6.52	0	-100.00%	13.9	-0.86	0	0	4
	mp-13	1994	1998	0.24	0	-100.00%	0.63	-0.16	0	0	4
	mp-16	1994	1998	0.07	0	-100.00%	0.12	0.01	0	0	4
<b>Aluminum</b>											
Allegheny-1	10	1986	1995	2.86	6.15	115.03%	4.9	0.82	9.27	3.01	2
	2	1986	1995	1.46	0.16	-89.04%	2.47	0.48	0.2	0.11	3
Allegheny-3	d-1p	1991	1998	0.59	0.12	-79.66%	0.61	0.57	0.15	0.08	3
Allegheny-4	BS12	1991	1995	22.01	4.07	-81.51%	23.99	20.03	5.73	2.4	3
	MD1	1991	1995	11.78	6.17	-47.62%	12.74	10.82	8.3	4.05	3
	MD2	1991	1995	0.09	0	-100.00%	0.73	-0.55	0.06	-0.06	2
Armstrong-5	MP-2	1988	1993	0.3	0	-100.00%	0.36	0.23	0	0	4
Armstrong-7	MP14	1988	1997	0.18	0.25	38.89%	0.31	0.05	0.29	0.2	2
	MP15	1988	1997	0.56	0.11	-80.36%	1.08	0.04	0.68	-0.47	2
	MP17	1988	1997	0.1	1.42	1320.00%	0.3	-0.09	2.27	0.55	1
	MP22	1988	1997	0.01	0.1	900.00%	0.05	-0.03	0.37	-0.18	2
	MP23	1988	1997	1.04	0.5	-51.92%	1.5	0.08	1.04	-0.05	2
	MP24	1988	1997	0.1	0.11	10.00%	0.17	0.03	0.17	0.04	2
Armstrong-12	mp2	1991	1995	0.43	0.1	-76.74%	0.66	0.2	0.15	0.06	3
	mph	1991	1995	0.43	0.2	-53.49%	0.66	0.2	0.27	0.13	2
Armstrong-13	41	1990	1995	1.23	0	-100.00%	1.77	0.7	0	0	4
	Unit 2	1990	1995	20.53	0.21	-98.98%	22.47	18.6	0.39	0.09	3
Armstrong-14	1	1991	1993	0.2	0	-100.00%	0.31	0.1	0	0	4
Armstrong-15	V2	1992	1997	2.2	0.78	-64.55%	2.85	1.55	1.34	0.22	3
Butler-3	S-116	86	1994	3.55	0.37	-89.58%	4.43	2.67	2.95	-2.2	2
	S-13	86	1994	0.59	0	-100.00%	0.91	0.26	0	0	4
	S-200	86	1994	0.12	0.1	-16.67%	0.35	-0.11	0.62	-0.43	2
	S-91	86	1994	0.44	0	-100.00%	0.69	0.198	0	0	4
	S-95/96	86	1994	0.26	0	-100.00%	0.45	0.07	0.09	-0.09	2
Butler-4	DR2	1991	1998	0.39	0	-100%	0.57	0.22	0	0	4
Clarion-4	2	1990	1996	0.02	0.01	-50.00%	0.03	0.02	0.02	0	2
Clarion-5	DR-1	1990	1992	1.96	3.56	81.63%	4.19	0.92	6.19	0.93	2
Clearfield-4	tk-18	1985	1997	4.65	2.2	-52.69%	6.22	3.08	2.76	1.65	3
	tk-21	1985	1997	3.34	0.22	-93.41%	5.35	1.33	0.69	-0.26	3
	TK-3	1985	1997	2.77	0.91	-67.15%	3.88	1.66	1.1	0.72	3
	tk-37	1985	1997	0.34	0.63	85.29%	0.91	-0.23	0.83	0.43	2
	tk-4	1985	1997	0.06	0.01	-83.33%	0.15	-0.03	0.02	0.01	2
	tk-7	1985	1997	0.39	0	-100.00%	0.45	0.33	0	0	4
Clearfield-7	12	1989	1997	0.08	0.08	0.00%	0.14	0.02	0.13	0.03	2
	13	1989	1997	10.45	9.21	-11.87%	13.55	7.34	11.19	7.24	2

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Clearfield-11	subf-a	1993	1994	0.58	0.61	5.17%	0.79	0.37	0.79	0.42	2
	subf-b	1993	1994	0.11	0.03	-72.73%	0.16	0.06	0.06	0	2
	subf-c	1993	1994	0.63	0.24	-61.90%	0.87	0.38	0.42	0.05	2
Fayette-1	mp-4	1989	1993	0.92	0.52	-43.48%	1.42	0.41	0.54	0.5	2
	mp-5	1989	1993	1.24	0	-100.00%	1.56	0.92	0	0	4
	mp-6	1989	1993	0.17	0	-100.00%	0.34	-0.01	0	0	4
	mp-8	1989	1993	0.29	0.02	-93.10%	0.72	-0.16	0.02	0.02	2
Fayette-2	HU-1	1984	1992	81.56	22.39	-72.55%	119.91	43.2	28.44	16.33	3
Fayette-4	MP6	1988	1993	0.06	0.27	350.00%	0.55	-0.44	0.95	-0.4	2
Fayette-6	MP-1	1988	1994	11.94	1.04	-91.29%	16.8	7.07	3.23	-1.15	3
Fayette-7	MP48	1989	1996	23.55	28.69	21.83%	34.15	12.95	43.05	14.33	2
	MP49	1989	1996	6.88	12.82	86.34%	10.99	2.77	16.3	9.34	2
Fayette-8	MP-15	1988	1994	10.21	6.13	-39.96%	14.83	5.59	23.1	-10.84	2
Fayette-9	MP-28	1990	1998	16.57	6.9	-58.36%	26.52	6.62	12.9	1.9	2
Fayette-10	mp-11	1989	1992	3.14	1.27	-59.55%	4.89	1.39	3.18	-0.64	2
	mp-2	1989	1992	0.39	0.97	148.72%	0.52	0.26	1.33	0.6	1
Fayette-11	mp 29	1991	1998	2.23	2.24	0.45%	6.05	-1.59	2.97	1.51	2
Fayette-12	MP68	1991	1997	0.34	0.43	26.47%	0.65	0.03	0.75	0.1	2
Fayette-14	mp-19	1991	1998	0.65	0	-100.00%	1.17	0.14	0	0	4
	mp-57	1991	1998	2.9	0.16	-94.48%	5.89	-0.08	0.4	-0.07	2
	mp-60	1991	1998	7.83	3.5	-55.30%	12.09	3.58	6.7	0.3	2
	mp56	1991	1998	6.85	53.42	679.85%	16.56	-2.85	91.33	15.52	2
Fayette-15	MD8/BS29	1991	1995	1.35	0	-100.00%	3.57	-0.86	0	0	4
Fayette-16	MP-42	1994	1996	0.37	0.07	-81.08%	1.7	-0.97	0.69	-0.55	2
	MP-8	1994	1996	6.23	2.22	-64.37%	8.55	3.91	4.32	0.13	2
Jefferson-3	HU-1	1989	1992	0	0	N/A	0.01	0	0	0	4
Jefferson-4	HU-1	1989	1996	2.73	0.02	-99.27%	3.4	2.06	0.04	-0.01	3
Jefferson-5	MP-33	1989	1998	0.24	0	-100.00%	0.62	-0.13	0	0	4
	MP-8B	1989	1998	7.32	4.59	-37.30%	8.52	6.13	6.44	2.74	2
Jefferson-6	S-25	1993	1998	0.07	0.01	-85.71%	0.12	0.04	0.01	0.01	3
	s-34	1993	1998	0.08	0.11	37.50%	0.12	0.05	0.26	-0.04	2
Jefferson-7	MP-1	1991	1995	0.04	0	-100.00%	0.05	0.02	0	0	4
Venango-1	1	1989	1994	4.08	1.45	-64.46%	12.46	1.34	2.37	0.53	2
Wash. -1	HU1	1986	1993	36.3	2.45	-93.25%	47.26	25.34	4.03	0.86	3
Wash. -2	A	1985	1998	20.02	0.04	-99.80%	29.31	10.73	0.09	0	3
Wash. -4	MP-1	1989	1998	50.9	0.18	-99.65%	72.81	28.99	0.3	0.06	3
	MP-2	1989	1998	44.76	0	-100.00%	58.22	31.31	0	0	4
Wash. -5	d-1	1987	1996	0.59	0.1	-83.05%	0.61	0.57	0.33	-0.13	3
Wash. -7	se1a	1995	1998	0.09	0	-100.00%	0.42	-0.23	0	0	4
West-moreland-1	MP10	1984	1993	1.14	2.96	159.65%	2.29	-0.01	4.7	1.21	2
	MP7	1984	1993	1.51	3.88	156.95%	2.43	0.6	5.62	2.14	2
	MP9	1984	1993	0.01	0.07	600.00%	0.04	-0.03	0.12	0.01	2
West-moreland-2	S8	1985	1994	2.63	0.78	-70.34%	3.94	1.31	1.47	0.1	2
West-moreland-3	CP2	1986	1990	1.68	0.63	-62.50%	2.48	0.87	0.88	0.36	2
	Culvert	1986	1986	1.54	0.13	-91.56%	5.2	-2.12	0.25	0	2
West-moreland-5	HU-1	1986	1996	52.83	26.86	-49.16%	114.57	-8.91	46.87	6.85	2

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West-moreland-6	M	1985	1993	0.4	0.54	35.00%	0.73	0.07	0.8	0.28	2
	N	1985	1993	0.11	0.07	-36.36%	0.33	0	0.36	-0.24	2
West-moreland-7	MP-3	1986	1991	0.77	0.01	-98.70%	1.04	0.48	0.02	0.01	3
	MP-4	1986	1991	23.86	38.29	60.48%	47.88	-0.18	44.81	31.76	2
West-moreland-8	MP-4	1987	1998	0.64	0	-100.00%	0.9	0.38	0	0	4
West-moreland-9	MP-46	1987	1993	40.11	39.55	-1.40%	50.39	29.84	55.21	23.88	2
	MP-47	1987	1993	40.8	53.41	30.91%	58.68	22.92	105.82	1	2
	MP-51	1987	1993	0.56	1.88	235.71%	0.8	0.3	2.91	0.84	1
	MP-52	1987	1993	0.34	0.29	-14.71%	0.45	0.22	1.3	-0.72	2
	MP-56	1987	1993	0.71	0.77	8.45%	1.03	0.37	1.49	0.04	2
	MP-60	1987	1993	1.12	0.6	-46.43%	1.58	0.65	1.17	0.03	2
	MP-A	1987	1995	0.24	0.03	-87.50%	0.79	-0.31	0.06	-0.01	2
West-moreland-10	MP12	1988	1995	4.53	5.73	26.49%	10.49	-1.45	8.81	2.65	2
West-moreland-12	MP-1	1988	1995	28.77	0	-100.00%	40.45	17.09	0	0	4
	MP-2	1988	1995	0.98	0.87	-11.22%	1.7	0.26	1.57	0.17	2
	MP-3	1988	1995	4.08	3.37	-17.40%	6.39	1.77	4.25	2.48	2
	MP-4	1988	1995	5.65	0.03	-99.47%	8.74	2.56	0.34	-0.27	3
	MP-5	1988	1995	3.34	6.88	105.99%	6.18	0.49	10.78	2.97	2
	MP-6	1988	1995	5.39	8.22	52.50%	7.69	3.09	17.67	-1.24	2
	MP-A	1988	1995	6.65	4.95	-25.56%	10.84	2.46	8.09	1.8	2
	MP-B	1988	1995	4.57	2.13	-53.39%	6.77	2.37	2.98	1.29	2
	MP-C	1988	1995	1.18	1.98	67.80%	2.47	-0.11	2.68	1.29	2
	MP-D	1988	1995	0.23	0.07	-69.57%	0.35	0.11	0.15	-0.02	2
West-moreland-13	mp-a	1989	1993	0.79	0.72	-8.86%	0.97	0.62	1.23	0.2	2
	mp-b	1989	1993	7.74	0.23	-97.03%	9.64	5.83	0.29	0.15	3
West-moreland-14	HU-1	1988	1995	2.73	0.08	-97.07%	3.33	2.14	0.23	-0.07	3
West-moreland-15	SLK-GW-27	1994	1999	0.03	0.02	-33.33%	0.04	0	0.05	0	2
West-moreland-16	mp-8	1990	1995	1.83	0.74	-59.56%	2.23	1.43	1.2	0.29	3
West-moreland-18	1	1989	1995	0.02	0.02	0.00%	0.02	0.01	0.03	0.01	2
	2	1989	1995	0.67	0.64	-4.48%	1	0.35	1.46	-0.19	2
	3	1989	1995	0.53	0.89	67.92%	0.84	0.21	1.79	0	2
West-moreland-19	MP16	1993	1999	0.07	0.03	-57.14%	0.09	0.06	0.03	0.02	3
	MP5	1993	1999	0.16	0	-100.00%	0.21	0.11	0	0	4
	MP6	1993	1999	0.07	0.26	271.43%	0.09	0.06	0.42	0.1	1

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West-moreland-23	103	1994	1998	0.12	0	-100.00%	0.17	0.08	0	0	4
	69	1994	1998	0.69	0	-100.00%	1.41	-0.04	0	0	4
<b>Iron</b>											
Allegheny-1	10	1986	1995	0.1	0.11	10.00%	0.15	0.04	0.19	0.03	2
	2	1986	1995	0.09	0.12	33.33%	0.11	0.05	0.15	0.07	2
Allegheny-2	S-6	1989	1998	0.37	3.5	845.95%	0.62	0.12	4.74	2.27	1
	S-7	1989	1989	24.63	1.55	-93.71%	33.57	15.68	3.41	-0.42	3
Allegheny-3	d-1p	1991	1998	0.06	0.03	-50.00%	0.09	0.02	0.05	0.01	2
Allegheny-4	BS12	1991	1995	4.7	0.88	-81.28%	4.91	4.49	1.06	0.7	3
	MD1	1991	1995	1.81	1.37	-24.31%	2.27	1.35	1.71	1.04	2
	MD2	1991	1995	0.02	0	-100.00%	0.04	0	0	0	4
Allegheny-5	MP-2	1993	1995	0.03	0.01	-66.67%	0.04	0.01	0.02	0	2
Armstrong-1	1A	1984	1990	0.39	0.34	-12.82%	0.7	0.07	0.55	0.13	2
Armstrong-2	D-1	1986	1995	1.55	0.01	-99.35%	3.73	-0.64	0.02	0	2
	D-112	1986	1995	0	0.02	N/A	0.01	0	0.03	0	2
	D-4	1986	1995	0.05	0.06	20.00%	0.09	0.01	0.11	0.01	2
Armstrong-3	w-1A	1986	1992	0.27	0.16	-40.74%	0.39	0.13	0.22	0.1	2
	w-2A	1986	1992	0.78	5.36	587.18%	1.26	0.3	8.13	2.59	1
	w-3A	1986	1992	0.14	0.23	64.29%	0.23	0.03	0.29	0.1	2
Armstrong-5	MP-2	1988	1993	0.02	0	-100.00%	0.02	0.01	0	0	4
Armstrong-6	1	1988	1995	0.41	0.02	-95.12%	0.58	0.25	0.02	0.01	3
Armstrong-7	MP14	1988	1997	0.01	0.01	0.00%	0.01	0	0.01	0	2
	MP15	1988	1997	0.75	0.29	-61.33%	1.07	0.43	0.91	-0.34	2
	MP17	1988	1997	0.03	0.29	866.67%	0.08	-0.01	0.43	0.14	1
	MP22	1988	1997	0	0.03	N/A	0.75	-0.55	0.27	-0.21	2
	MP23	1988	1997	0.16	0.09	-43.75%	0.29	0.02	0.27	-0.1	2
	MP24	1988	1997	0.01	0.01	0.00%	0.03	-0.01	0.02	0	2
Armstrong-9	HU1	1988	1998	0.13	0.03	-76.92%	0.21	0.06	0.05	0.01	3
Armstrong-10	C-11	1989	1995	0.51	0.24	-52.94%	0.6	0.42	0.3	0.19	3
	S-20	1989	1995	9.21	7.09	-23.02%	10.45	7.97	8.73	5.44	2
Armstrong-11	HU1	1990	1997	0.04	0	-100.00%	0.07	0	0	0	4
Armstrong-12	mp2	1991	1995	1.97	0.27	-86.29%	3.21	0.72	0.33	0.21	3
	mph	1991	1995	0.02	0.01	-50.00%	0.03	0	0.01	0	2
Armstrong-13	41	1990	1995	0.02	0	-100.00%	0.03	0.01	0	0	4
	48	1990	1995	0.24	0	-100.00%	0.32	0.17	0	0	4
	Unit 2	1990	1995	23.76	0.42	-98.23%	27.89	19.62	0.62	0.22	3
Armstrong-14	1	1991	1993	0.21	0	-100.00%	0.43	0	0	0	4

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Armstrong-15	V2	1992	1997	0.3	0.13	-56.67%	0.44	0.16	0.3	-0.04	2
Armstrong-16	HU1	1993	1998	0.08	0.34	325.00%	0.16	0	0.5	0.18	1
Beaver-1	S-10	1988	1995	3.81	2.99	-21.52%	4.43	3.18	3.99	1.99	2
Butler-1	5W	1986	1991	0.51	0.22	-56.86%	0.76	0.26	0.36	0.08	2
Butler-2	2W	1984	1989	0.01	0	-100.00%	0.01	0.01	0	0	4
	5AW	1984	1989	0.02	0.01	-50.00%	0.03	0.01	0.02	0	2
	8W	1984	1989	0.02	0	-100.00%	0.02	0.02	0.01	0	3
Butler-3	S-116	1986	1994	0.01	0.01	0.00%	0.01	0.01	0.02	0	2
	S-13	1986	1994	0.02	0	-100.00%	0.05	-0.02	0	0	4
	S-200	1986	1994	0.03	0.01	-66.67%	0.04	0.02	0.05	-0.03	2
	S-91	1986	1994	0	0	N/A	0.01	-0.01	0	0	4
Butler-4	DR-2	1991	1998	7.05	0	-100%	8.97	5.13	0	0	4
Butler-5	1	1991	1998	0.36	0.17	-52.78%	0.47	0.26	0.42	-0.09	2
Cambria-1	MP 9	1990	1995	0.01	0.02	100.00%	0.02	0	0.03	0.01	2
	MP 13	1990	1995	0.02	0	-100.00%	0.03	0	0	0	4
Clarion-1	SP-1	1985	1995	107.89	24.34	-77.44%	119.01	96.77	30.16	18.52	3
	SP-28	1985	1995	45.56	15.51	-65.96%	61.06	30.06	19.19	11.82	3
	SP-5	1985	1995	0.11	0	-100.00%	0.19	0.02	0	0	4
	SP-6	1985	1995	27.58	0	-100.00%	36.23	18.94	0	0	4
Clarion-2	1	1986	1989	0.02	1.125	5525.00%	0.04	0	1.54	0.7	1
Clarion-3	RH-78	1990	1994	1.52	0	-100.00%	1.76	1.29	0	0	4
	RH-79	1990	1994	0.36	0	-100.00%	0.46	0.27	0	0	4
	RH-82	1990	1994	0.23	0	-100.00%	0.27	0.2	0	0	4
	RH-84	1990	1994	0.28	0.25	-10.71%	0.35	0.22	0.48	0.01	2
	RH-91	1990	1994	0.38	0	-100.00%	0.46	0.29	0.11	-0.11	3
	RH-93	1990	1994	0.28	0.07	-75.00%	0.32	0.24	0.17	-0.03	3
	RH-94	1990	1994	0.65	0	-100.00%	0.74	0.56	0	0	4
	RH-96	1990	1994	0.03	0	-100.00%	0.06	0.01	0	0	4
Clarion-4	1	1990	1996	0.04	0	-100.00%	0.06	0.02	0	0	4
	2	1990	1996	0.22	0.08	-63.64%	0.27	0.16	0.11	0.04	3
Clarion-5	DR-1	1990	1992	0.36	2.63	630.56%	0.53	0.24	5.85	-0.6	2
Clearfield-1	unit 1	1985	1998	47.81	18.73	-60.82%	59.45	36.17	23.58	13.88	3
Clearfield-2	W10	1985	1998	1.34	0.61	-54.48%	1.82	0.85	0.95	0.28	2
	W42	1985	1998	0.59	0.27	-54.24%	0.74	0.43	0.35	0.18	3
	W43	1985	1998	0.94	0.91	-3.19%	1.45	0.43	1.49	0.34	2
	W44	1985	1998	0.5	0.41	-18.00%	0.85	0.13	0.54	0.29	2
Clearfield-3	SF-1	1986	1998	0.23	0.06	-73.91%	0.29	0.16	0.12	0.01	3
	SF10	1986	1998	0.18	0	-100.00%	0.29	0.06	0	0	4
	SF4	1986	1998	0.03	0	-100.00%	0.05	0	0.01	-0.01	2
	SF6	1986	1998	0.01	0	-100.00%	0.02	-0.01	0.01	0	2
	SF61	1986	1998	0.49	0.05	-89.80%	0.94	0.03	0.22	-0.12	2
Clearfield-4	tk-18	1985	1997	6.47	9.87	52.55%	8.85	4.09	10.22	9.51	1
	tk-21	1985	1997	0.08	0.03	-62.50%	0.14	0.02	0.06	0	2
	TK-3	1985	1997	13.52	8.71	-35.58%	14.68	12.36	11.32	6.1	3
	tk-37	1985	1997	0.01	0.01	0.00%	0.01	0.01	0.01	0	2

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	tk-4	1985	1997	0.21	0.16	-23.81%	0.31	0.11	0.24	0.09	2
	tk-7	1985	1997	0.21	0	-100.00%	0.29	0.13	0	0	4
Clearfield-5	SV-5	1988	1992	0.3	0.36	20.00%	0.35	0.23	0.43	0.33	2
	SV-8	1988	1992	0.09	0.1	11.11%	0.12	0.05	0.13	0.07	2
Clearfield-6	R-3	1988	1995	0.04	0	-100.00%	0.06	0.02	0.01	-0.01	3
	R-5	1988	1995	0.01	0	-100.00%	0	0	0	0	4
	R-8	1988	1995	3.38	2.06	-39.05%	4.99	1.75	3.44	0.67	2
Clearfield-7	12	1989	1997	0.04	0.01	-75.00%	0.08	0.01	0.02	0	2
	13	1989	1997	10.52	6.75	-35.84%	14.5	6.54	7.83	5.67	2
Clearfield-8	TK4	1990	1996	0.22	0.12	-45.45%	0.3	0.15	0.2	0.04	2
	TK7	1990	1996	0.04	0	-100.00%	0.06	0.01	0	0	4
Clearfield-9	1	1990	1994	2.81	0	-100.00%	4.1	1.52	0	0	4
	2	1990	1994	0.01	0	-100.00%	0.04	0	0	0	4
Clearfield-10	HU 1	1992	1998	0.02	0.01	-50.00%	0.05	-0.01	0.02	0	2
	HU 2	1992	1998	0.01	0	-100.00%	0.01	0.01	0	0	4
	HU 3	1992	1998	0.01	0	-100.00%	0.02	0.01	0	0	4
Clearfield-11	subf-a	1993	1994	0.03	0.02	-33.33%	0.04	0.02	0.03	0.01	2
	subf-b	1993	1994	0.01	0	-100.00%	0.01	0	0	0	4
	subf-c	1993	1994	0.02	0.01	-50.00%	0.03	0.01	0.01	0	2
Clinton-1	96	1981	1995	0.04	0	-100.00%	0.06	0.01	0	0	4
	97	1981	1995	0.04	0	-100.00%	0.06	0.01	0	0	4
	13	1981	1995	0.08	0	-100.00%	0.1	0.05	0	0	4
	15A	1981	1995	0.07	0	-100.00%	0.1	0.03	0	0	4
	SNW 1A	1981	1996	1.7	1.23	-27.65%	2.57	0.8	1.7	0.76	2
Clinton-2	GR-9	1988	1993	2.6	0.37	-85.77%	5.05	0.15	4.02	-3.28	2
Clinton-3	SEH-31	1990	1993	0.17	0.07	-58.82%	0.23	0.11	0.09	0.05	3
	SHE-30	1990	1993	0.37	1.11	200.00%	0.76	-0.02	1.31	0.91	1
Fayette-1	mp-4	1989	1993	0.88	0.22	-75.00%	1.25	0.51	0.23	0.2	3
	mp-5	1989	1993	1.6	0	-100.00%	2.31	0.87	0	0	4
	mp-6	1989	1993	0.39	0	-100.00%	0.75	0.03	0	0	4
	mp-8	1989	1993	2.49	0.09	-96.39%	3.87	1.11	0.1	0.09	3
Fayette-2	HU-1	1984	1992	37.36	11.59	-68.98%	45.42	29.29	13.08	10.08	3
Fayette-4	MP6	1988	1993	0.17	0.11	-35.29%	0.39	-0.06	0.49	-0.26	2
Fayette-5	mp-4	1988	1998	286	68.69	-75.98%	338	235	80.46	56.91	3
	mp-hua	1988	1998	211	55.27	-73.81%	295	127	72.69	37.85	3
Fayette-6	MP-1	1988	1994	15.4	0.6	-96.10%	21.44	9.36	1.37	-0.16	3
Fayette-7	MP48	1989	1996	28.52	23.44	-17.81%	40.04	17	38.42	8.47	2
	MP49	1989	1996	3.03	5.87	93.73%	4.78	1.27	7.92	3.81	2
Fayette-8	MP-15	1988	1994	0.05	0.05	0.00%	0.07	0.04	0.15	-0.06	2
Fayette-9	MP-28	1990	1998	1.47	0.77	-47.62%	2.83	0.1	1.31	0.23	2
Fayette-10	mp-1	1989	1992	4.27	1.25	-70.73%	5.34	3.21	1.95	0.54	3
	mp-11	1989	1992	0.34	0.2	-41.18%	0.43	0.26	0.34	0.06	2
	mp-2	1989	1992	0.05	0.16	220.00%	0.09	0.02	0.27	0.05	2
Fayette-11	mp 29	1991	1998	1.94	1.72	-11.34%	4.13	-0.25	3.78	-0.35	2
Fayette-12	MP68	1991	1997	0.05	0.06	20.00%	0.08	0.02	0.08	0.04	2
Fayette-13	D5	1991	1995	1.19	1.71	43.70%	1.8	0.58	2.33	1.09	2
Fayette-14	mp-19	1991	1998	0.27	0	-100.00%	0.41	0.13	0	0	4
	mp-57	1991	1998	0.12	0.01	-91.67%	0.28	-0.04	0.03	-0.01	2
	mp-60	1991	1998	0.38	0.17	-55.26%	0.79	-0.02	0.29	0.04	2

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	mp56	1991	1998	1.11	11.29	917.12%	3.75	-1.53	19.48	3.09	2
Fayette-15	MD1/MD2	1991	1995	0.03	0.01	-66.67%	0.06	-0.01	0.02	0	2
	MD8/BS29	1991	1995	0.23	0.17	-26.09%	0.52	-0.05	0.21	0.12	2
Fayette-16	MP-42	1994	1996	0.05	0	-100.00%	0.43	-0.34	0.14	-0.14	2
	MP-8	1994	1996	1.79	0.61	-65.92%	2.41	1.17	1.18	0.04	2
Greene-1	MP-51	1987	1988	0.05	0	-100.00%	0.11	-0.02	0	0	4
Greene-2	hu1	1989	1994	4.01	0.41	-89.78%	4.74	3.29	0.86	-0.05	3
Indiana-1	H	1988	1995	6.96	5.19	-25.43%	9.9	4.01	6.77	3.6	2
	J	1988	1995	1.84	1.07	-41.85%	3.02	0.65	2.01	0.24	2
	K	1988	1995	0.62	0.43	-30.65%	0.83	0.41	0.69	0.18	2
	L	1988	1995	1.35	0.01	-99.26%	2.14	0.54	0.41	-0.38	3
	M	1988	1995	0.11	0.07	-36.36%	0.25	-0.04	0.15	0	2
	N	1988	1995	0.05	0.01	-80.00%	0.58	-0.49	0.02	0	2
Indiana-2	O	1988	1995	0	0	N/A	0.01	0	0	0	4
	MP 5	1988	1997	13.63	4.34	-68.16%	22.86	4.38	6.77	1.92	2
	MP 15	1988	1997	0.18	0.09	-50.00%	0.25	0.1	0.15	0.04	3
Indiana-3	1 (A)	1992	1998	0.01	0	-100.00%	0.02	-0.01	0	0	4
	2 (B)	1992	1998	6.66	1.79	-73.12%	9.08	4.25	2.3	1.28	3
	3 (C)	1992	1996	4.76	18.73	293.49%	5.96	3.55	56.41	-18.95	2
Jefferson-1	1	1984	1993	0.23	0.31	34.78%	0.36	0.1	0.75	-0.12	2
Jefferson-2	MP-13	1986	1996	0.02	0.03	50.00%	0.03	-0.01	0.05	0.02	2
Jefferson-4	HU-1	1989	1996	0.71	0.53	-25.35%	1.13	0.29	1.32	-0.25	2
Jefferson-5	MP-33	1989	1998	0.17	0	-100.00%	0.28	0.06	0	0	4
	MP-8B	1989	1998	8.55	4.57	-46.55%	10.54	6.55	6.3	2.84	3
Jefferson-6	S-25	1993	1998	0.01	0.01	0.00%	0.01	0	0.01	0.01	2
	s-34	1993	1998	0.01	0.01	0.00%	0.01	0	0.01	0.01	2
Jefferson-7	MP-1	1991	1995	0	0	N/A	0.01	0	0	0	4
Lawrence-1	1	1992	1998	0.25	0	-100.00%	0.42	0.07	0	0	4
Somerset-1	SP16	1989	1998	0.04	0.03	-25.00%	0.04	0.03	0.04	0.02	2
Somerset-2	1	1993	1998	0.09	0.31	244.44%	0.11	0.06	0.97	-0.34	2
Venango-1	1	1989	1994	0.25	0.64	156.00%	0.41	0.16	0.95	0.33	2
Wash. -1	HU1	1986	1993	29.24	18.77	-35.81%	52.38	6.1	27.17	10.37	2
Wash. -2	A	1985	1998	1.93	0.02	-98.96%	2.55	1.32	0.03	0.01	3
Wash. -3	CV103	1985	1998	38.7	353.52	813.49%	47.19	30.19	460.23	246.8	1
	CV4	1985	1998	17.36	31.59	81.97%	23.31	11.4	39.81	23.36	1
Wash. -4	MP-1	1989	1998	8.49	0.22	-97.41%	11.52	5.47	0.32	0.12	3
	MP-2	1989	1998	6.38	0	-100.00%	8.84	3.91	0	0	4
Wash. -5	d-1	1987	1996	0.06	0.02	-66.67%	0.09	0.02	0.03	0.01	2
Wash. -6	D5	1992	1997	4.08	0.46	-88.73%	5.44	2.72	0.55	0.36	3
West-moreland-1	MP10	1984	1993	0.1	0.1	0.00%	0.15	0.05	0.14	0.05	2
	MP7	1984	1993	0.76	0.74	-2.63%	1.14	0.38	1.28	0.2	2
	MP9	1984	1993	0.03	0.02	-33.33%	0.04	0.01	0.04	-0.01	2
West-moreland-2	S8	1985	1994	0.1	0.02	-80.00%	0.13	0.06	0.04	-0.01	3

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West-moreland-3	CP2	1986	1990	0.03	0.17	466.67%	0.08	-0.03	0.24	0.09	1
	Culvert	1986	1986	0.15	0.02	-86.67%	1.12	-0.84	0.04	0	2
West-moreland-4	MD-1	1986	1990	0.08	0.17	112.50%	0.7	-0.55	0.49	-0.16	2
	MD-3	1986	1990	0.17	0	-100.00%	2	-1.67	0	-0.01	4
	MD-4	1986	1990	0.75	0.28	-62.67%	2.15	-0.66	0.44	0.11	2
	MD-6	1986	1990	7.3	0.97	-86.71%	15.38	-0.8	1.55	0.39	2
	MD-7	1986	1990	3.8	0.89	-76.58%	7.68	-0.08	1.42	0.35	2
West-moreland-5	HU-1	1986	1996	46.62	22.48	-51.78%	79.07	14.16	38.11	6.85	2
West-moreland-6	M	1985	1993	0.08	0.09	12.50%	0.12	0.03	0.12	0.05	2
	N	1985	1993	0.02	0	-100.00%	0.05	0	0	0	4
West-moreland-7	MP-3	1986	1991	0.57	0.1	-82.46%	0.7	0.4	0.16	0.04	3
	MP-4	1986	1991	7.1	9.19	29.44%	13.29	0.89	13.83	4.56	2
West-moreland-8	MP-4	1987	1998	1.04	0	-100.00%	1.48	0.59	0	0	4
West-moreland-9	MP-46	1987	1993	53.49	63.29	18.32%	72.28	34.7	90.51	36.05	2
	MP-47	1987	1993	32.67	37.44	14.60%	50.74	14.59	84.01	-9.15	2
	MP-51	1987	1993	0.04	0.41	925.00%	0.06	0.02	0.74	0.07	1
	MP-52	1987	1993	0.01	0.01	0.00%	0.01	0	0.03	-0.01	2
	MP-56	1987	1993	0.01	0	-100.00%	0.01	0	0	0	4
	MP-60	1987	1993	0.04	0.02	-50.00%	0.11	-0.04	0.03	0	2
	MP-A	1987	1995	3.21	0.84	-73.83%	4.63	1.79	1.82	-0.14	2
West-moreland-10	MP12	1988	1995	0.27	0.76	181.48%	0.79	-0.27	1.11	0.41	2
West-moreland-11	MP3	1988	1992	94.65	54.32	-42.61%	110.31	78.98	62.26	46.77	3
West-moreland-12	MP-1	1988	1995	71.8	0	-100.00%	102.04	41.56	0	0	4
	MP-2	1988	1995	0.2	0.14	-30.00%	0.34	0.06	0.28	0	2
	MP-3	1988	1995	4.03	0.78	-80.65%	8.36	-0.3	1.06	5	2
	MP-4	1988	1995	16.32	0.06	-99.63%	24.41	8.23	0.34	-0.23	3
	MP-5	1988	1995	3.67	8.13	121.53%	8.69	-1.35	13.57	2.69	2
	MP-6	1988	1995	7.11	10.03	41.07%	10.57	3.65	22.16	-2.11	2
	MP-A	1988	1995	0.92	0.47	-48.91%	1.84	0	0.76	0.18	2
	MP-B	1988	1995	0.42	0.18	-57.14%	0.75	0.09	0.28	0.07	2
West-moreland-13	mp-a	1989	1993	0.03	0.02	-33.33%	0.03	0.02	0.04	-0.01	2
	mp-b	1989	1993	0.25	0.06	-76.00%	0.32	0.18	0.09	0.01	3
West-moreland-14	HU-1	1988	1995	2.48	3.94	58.87%	3.4	1.56	5.31	2.56	2
	MP-5A	1988	1995	0	0.01	N/A	0.02	-0.02	0.03	-0.02	2

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West-moreland-15	SLK-GW-27	1994	1999	0.37	0	-100.00%	0.69	0.04	0	0	4
West-moreland-16	mp-8	1990	1995	0.67	0.96	43.28%	0.87	0.46	1.38	0.55	2
West-moreland-17	SW18	1989	1993	0.04	0	-100.00%	0.05	0.03	0	0	4
West-moreland-18	1	1989	1995	0.06	0.06	0.00%	0.08	0	0.09	0.03	2
	2	1989	1995	0.08	0.06	-25.00%	0.11	0.05	0.12	0	2
	3	1989	1995	0.05	0.06	20.00%	0.08	0.01	0.16	0	2
West-moreland-19	MP5	1993	1999	0	0	N/A	0.01	0	0	0	4
West-moreland-20	mp-7	1991	1998	0	0	N/A	0.01	0	0	0	4
West-moreland-21	MP3	1992	1997	0.04	0	-100.00%	0.06	0.02	0.01	0	3
West-moreland-22	mp-13	1994	1998	0.02	0	-100.00%	0.11	-0.07	0	0	4
	mp-16	1994	1998	0.03	0	-100.00%	0.05	0.01	0	0	4
<b>Manganese</b>											
Allegheny-1	10	1986	1995	0.25	0.88	252.00%	0.3	0.18	1.28	0.47	1
	2	1986	1995	0.56	0.12	-78.57%	0.79	0.32	0.18	0.05	3
Allegheny-3	d-1p	1991	1998	0.15	0.07	-53.33%	0.17	0.14	0.1	0.03	3
Allegheny-4	BS12	1991	1995	1.14	0.24	-78.95%	1.32	0.96	0.31	0.16	3
	MD1	1991	1995	0.74	0.52	-29.73%	0.79	0.69	0.65	0.39	3
	MD2	1991	1995	0.07	0	-100.00%	0.12	0.02	0.01	-0.01	3
Allegheny-5	MP-2	1993	1995	0.13	0.02	-84.62%	0.21	0.05	0.03	0.01	3
Armstrong-1	1A	1984	1990	0.51	0.33	-35.29%	0.75	0.26	0.53	0.13	2
Armstrong-6	1	1988	1995	1.09	0.25	-77.06%	1.39	0.8	0.29	0.21	3
Armstrong-10	C-11	1989	1995	0.07	0.01	-85.71%	0.09	0.05	0.01	0	3
	S-20	1989	1995	0.5	0.22	-56.00%	0.68	0.31	0.3	0.14	3
Armstrong-12	mp2	1991	1995	0.23	0.05	-78.26%	0.38	0.07	0.06	0.04	3
	mph	1991	1995	0.09	0.06	-33.33%	0.14	0.05	0.09	0.04	2
Armstrong-13	41	1990	1995	0.37	0	-100.00%	0.46	0.28	0	0	4
	48	1990	1995	0.12	0	-100.00%	0.14	0.1	0	0	4
	Unit 2	1990	1995	6.35	0.31	-95.12%	7.12	5.58	0.44	0.18	3

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Armstrong-14	1	1991	1993	0.91	0	-100.00%	1.51	0.31	0	0	4
Armstrong-15	V2	1992	1997	0.35	0.12	-65.71%	0.45	0.25	0.24	0	3
Beaver-1	S-10	1988	1995	1.93	3.17	64.25%	2.39	1.46	4.02	2.33	2
Butler-1	5W	1986	1991	0.8	1.28	60.00%	1.65	-0.05	1.8	0.72	2
Butler-2	2W	1984	1989	0.01	0	-100.00%	0.02	0	0	0	4
	5AW	1984	1989	0.03	0.51	1600.00%	0.07	0	0.76	0.27	1
	8W	1984	1989	0.04	0.07	75.00%	0.06	0.02	0.1	0.04	2
Butler-3	S-116	1986	1994	3.6	0.42	-88.33%	4.22	2.98	0.95	-0.1	3
	S-13	1986	1994	0.44	0	-100.00%	0.58	0.28	0	0	4
	S-200	1986	1994	0.15	0.04	-73.33%	0.34	-0.04	0.22	-0.43	2
	S-91	1986	1994	0.24	0	-100.00%	0.36	0.12	0	0	4
	S-95/96	1986	1994	0.24	0	-100.00%	0.36	0.12	0.06	-0.06	3
Butler-4	DR2	1991	1998	0.12	0	-100.00%	0.14	0.1	0	0	4
Clarion-1	SP-1	1985	1995	5.78	1.11	-80.80%	6.27	5.29	1.54	0.68	3
	SP-28	1985	1995	3.94	1.14	-71.07%	4.57	3.31	1.46	0.82	3
	SP-5	1985	1995	0.13	0	-100.00%	0.17	0.08	0	0	4
	SP-6	1985	1995	1.22	0	-100.00%	1.55	0.89	0	0	4
Clarion-2	1	1986	1989	0.05	0.693	1286.00%	0.1	0	1.07	0.31	1
Clarion-3	RH-78	1990	1994	0.84	0	-100.00%	0.97	0.71	0	0	4
	RH-79	1990	1994	0.38	0	-100.00%	0.44	0.32	0	0	4
	RH-82	1990	1994	0.55	0	-100.00%	0.66	0.44	0.01	0	3
	RH-84	1990	1994	0.38	0.28	-26.32%	0.46	0.29	0.53	0.04	2
	RH-91	1990	1994	0.48	0	-100.00%	0.52	0.43	0.19	-0.19	3
	RH-93	1990	1994	0.25	0.06	-76.00%	0.3	0.21	0.16	-0.04	3
	RH-94	1990	1994	0.19	0	-100.00%	0.22	0.16	0	0	4
	RH-96	1990	1994	0.61	0	-100.00%	0.94	0.27	0	0	4
Clarion-4	1	1990	1996	0.04	0	-100.00%	0.05	0.03	0	0	4
	2	1990	1996	0.95	0.38	-60.00%	1.09	0.81	0.57	0.18	3
Clarion-5	DR-1	1990	1992	0.33	3.34	912.12%	0.47	0.23	7	-0.32	2
Clearfield-2	W10	1985	1998	3.99	4.15	4.01%	6.16	1.8	7.95	0.35	2
	W42	1985	1998	7.26	10.79	48.62%	11.04	3.47	15.05	6.54	2
	W43	1985	1998	0.94	29.81	3071.28%	1.45	0.43	49.54	10.09	1
	W44	1985	1998	9.54	8.21	-13.94%	14.61	4.46	13.32	3.11	2
Clearfield-3	SF-1	1986	1998	0.05	0.01	-80.00%	0.06	0.03	0.02	0	3
	SF10	1986	1998	0.05	0	-100.00%	0.08	0.01	0	0	4
	SF4	1986	1998	0.02	0.01	-50.00%	0.03	0	0.02	-0.01	2
	SF6	1986	1998	0.04	0.01	-75.00%	0.66	-0.59	0.04	-0.02	2
	SF61	1986	1998	0.11	0.02	-81.82%	0.19	0.02	0.07	-0.03	2
Clearfield-4	tk-18	1985	1997	6.2	8.12	30.97%	8.01	4.39	8.76	7.49	2
	tk-21	1985	1997	1.7	0.19	-88.82%	2.53	0.87	0.51	-0.13	3
	TK-3	1985	1997	6.9	5.77	-16.38%	7.75	6.05	7.43	4.11	2
	tk-37	1985	1997	2.11	1.59	-24.64%	3.54	0.68	2.07	1.11	2
	tk-4	1985	1997	0.31	0.11	-64.52%	0.46	0.16	0.16	0.07	2
	tk-7	1985	1997	0.4	0	-100.00%	0.49	0.31	0	0	4
Clearfield-5	SV-5	1988	1992	0.38	0.46	21.05%	0.43	0.32	0.62	0.37	2
	SV-8	1988	1992	0.98	0.78	-20.41%	1.51	0.45	1.07	0.6	2
Clearfield-6	R-3	1988	1995	0.47	0.02	-95.74%	0.64	0.28	0.07	-0.03	3
	R-5	1988	1995	0.42	0.31	-26.19%	0.62	0.21	0.51	0.11	2

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	R-8	1988	1995	2.23	1.48	-33.63%	2.77	1.68	1.87	1.09	2
Clearfield-7	12	1989	1997	0.02	0.07	250.00%	0.03	0	0.12	0.02	2
	13	1989	1997	1.42	2.2	54.93%	1.84	1.01	2.56	1.84	2
Clearfield-8	TK4	1990	1996	0.21	0.11	-47.62%	0.3	0.12	0.16	0.06	2
	TK7	1990	1996	0.2	0	-100.00%	0.27	0.13	0	0	4
Clearfield-9	1	1990	1994	0.02	0	-100.00%	0.05	0.01	0	0	4
	2	1990	1994	0	0	N/A	0.01	0	0	0	4
Clearfield-10	HU 1	1992	1998	0.15	0.21	40.00%	0.3	0.01	0.34	0.07	2
	HU 2	1992	1998	0.14	0.01	-92.86%	0.2	0.08	0.01	0	3
	HU 3	1992	1998	0.4	0.18	-55.00%	0.56	0.23	0.26	0.1	2
Clinton-2	GR-9	1988	1993	0.1	0.34	240.00%	0.2	-0.02	-1.97	2.65	1
Clinton-3	SEH-31	1990	1993	3.43	1.9	-44.61%	4.45	2.41	3.3	0.5	2
	SHE-30	1990	1993	0.14	1.29	821.43%	0.27	0.01	1.9	0.67	1
Fayette-1	mp-4	1989	1993	0.27	0.15	-44.44%	0.43	0.1	0.16	0.14	2
	mp-5	1989	1993	0.15	0	-100.00%	0.2	0.1	0	0	4
	mp-6	1989	1993	0.03	0	-100.00%	0.05	0	0	0	4
	mp-8	1989	1993	0.2	0.05	-75.00%	0.3	0.08	0.05	0.05	3
Fayette-2	HU-1	1984	1992	3.4	2.82	-17.06%	4.48	2.3	3.2	2.43	2
Fayette-4	MP6	1988	1993	0.05	0.08	60.00%	0.09	0	0.29	-0.13	2
Fayette-6	MP-1	1988	1994	2.13	0.84	-60.56%	2.75	1.5	2.29	-0.61	2
Fayette-7	MP48	1989	1996	3.34	2.88	-13.77%	4.37	2.32	4.02	1.74	2
	MP49	1989	1996	0.97	1.26	29.90%	1.34	0.59	1.7	0.83	2
Fayette-8	MP-15	1988	1994	1.25	0.7	-44.00%	1.52	0.98	2.38	-0.99	2
Fayette-10	mp-1	1989	1992	1.11	0.62	-44.14%	1.35	0.87	1.13	0.11	2
	mp-11	1989	1992	0.93	0.43	-53.76%	1.22	0.64	0.82	0.04	2
	mp-2	1989	1992	0.08	0.16	100.00%	0.1	0.05	0.26	0.05	2
Fayette-11	mp 29	1991	1998	0.06	0.67	1016.67%	0.2	-0.08	1.04	0.3	1
Fayette-12	MP68	1991	1997	0.04	0.05	25.00%	0.07	0.01	0.1	0.01	2
Fayette-13	D5	1991	1995	1.91	1.79	-6.28%	2.68	1.14	2.3	1.28	2
Fayette-14	mp-19	1991	1998	0.04	0	-100.00%	0.08	0.01	0	0	4
	mp-57	1991	1998	0.41	0.32	-21.95%	0.8	0.03	0.77	-0.14	2
	mp-60	1991	1998	1.13	1.06	-6.19%	1.64	0.62	1.65	0.48	2
	mp56	1991	1998	1.01	5.64	458.42%	2.14	-0.13	9.37	1.91	2
Fayette-15	MD1/MD2	1991	1995	0.09	0	-100.00%	0.2	-0.02	0.01	-0.01	2
	MD8/BS29	1991	1995	0.18	0.43	138.89%	0.47	-0.12	0.54	0.32	2
Fayette-16	MP-42	1994	1996	0.03	0.01	-66.67%	0.08	-0.02	0.05	-0.02	2
	MP-8	1994	1996	0.24	0.13	-45.83%	0.33	0.14	0.19	0.06	2
Greene-1	MP-51	1987	1988	1.75	0	-100.00%	3.3	0.19	0	0	4
Greene-2	hu1	1989	1994	18.65	3.31	-82.25%	26.91	10.39	3.9	2.72	3
Indiana-3	1 (A)	1992	1998	0.23	0	-100.00%	0.44	0.02	0	0	4
	2 (B)	1992	1998	30.87	6.04	-80.43%	37.76	23.98	7.07	5	3
	3 (C)	1992	1996	17.87	15.8	-11.58%	20.29	15.46	24.83	6.77	2
Jefferson-1	1	1984	1993	0.1	3.87	3770.00%	0.21	-0.01	8.19	-0.44	2
Jefferson-2	MP-13	1986	1996	0.1	6.36	6260.00%	0.13	0.07	11.22	1.5	1
Jefferson-4	HU-1	1989	1996	1.18	0.64	-45.76%	1.49	0.87	0.88	0.39	2
Jefferson-5	MP-33	1989	1998	0.32	0	-100.00%	0.51	0.14	0	0	4
	MP-8B	1989	1998	0.18	0.14	-22.22%	0.22	0.14	0.21	0.07	2
Jefferson-6	S-25	1993	1998	0.08	2.05	2462.50%	0.11	0.06	3.38	0.72	1
	s-34	1993	1998	0.18	0.15	-16.67%	0.29	0.11	0.45	-0.15	2

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Jefferson-7	MP-1	1991	1995	0.3	0	-100.00%	0.4	0.2	0	0	4
Venango-1	1	1989	1994	0.71	0.94	32.39%	1.05	0.48	2.17	-0.28	2
Wash. -2	A	1985	1998	3.58	0.31	-91.34%	5.09	2.07	0.45	0.17	3
Wash. -4	MP-1	1989	1998	9.49	1.91	-79.87%	18.63	2.34	2.58	1.23	2
	MP-2	1989	1998	6.59	0	-100.00%	8.37	4.82	0	0	4
Wash. -5	d-1	1987	1996	0.15	0.03	-80.00%	0.17	0.14	0.11	-0.05	3
Wash. -6	D5	1992	1997	1.53	2.46	60.78%	2.17	0.89	2.59	2.34	1
Wash. -7	se1a	1995	1998	0.11	0	-100.00%	0.27	-0.04	0	0	4
West-moreland-1	MP10	1984	1993	1.05	1.09	3.81%	1.35	0.74	1.75	0.42	2
	MP7	1984	1993	0.63	1.37	117.46%	0.86	0.4	1.95	0.78	2
	MP9	1984	1993	0.02	0.04	100.00%	0.04	0.01	0.07	-0.01	2
West-moreland-2	S8	1985	1994	1.32	0.57	-56.82%	1.76	0.87	1.1	0.03	2
West-moreland-3	CP2	1986	1990	0.05	0.18	260.00%	0.05	0.04	0.28	0.07	1
	Culvert	1986	1986	0.05	0.09	80.00%	0.09	0.01	0.14	0.03	2
West-moreland-7	MP-3	1986	1991	0.34	0.04	-88.24%	0.44	0.22	0.05	0.03	3
	MP-4	1986	1991	6.9	12.1	75.36%	13.63	0.16	15.19	9.01	2
West-moreland-8	MP-4	1987	1998	0.07	0	-100.00%	0.09	0.03	0	0	4
West-moreland-9	MP-46	1987	1993	9.78	7.4	-24.34%	12.05	7.5	9.59	5.22	2
	MP-47	1987	1993	8.03	10.29	28.14%	11.74	4.3	19.25	1.33	2
	MP-51	1987	1993	0.24	0.27	12.50%	0.33	0.13	0.42	0.11	2
	MP-52	1987	1993	0.14	0.14	0.00%	0.18	0.09	0.34	-0.07	2
	MP-56	1987	1993	0.33	0.32	-3.03%	0.55	0.1	0.59	0.04	2
	MP-60	1987	1993	0.31	0.15	-51.61%	0.43	0.18	0.26	0.04	2
	MP-A	1987	1995	0.98	0.45	-54.08%	1.28	0.67	0.63	0.27	3
West-moreland-10	MP12	1988	1995	1.88	5.54	194.68%	4.4	-0.66	7.29	3.79	2
West-moreland-12	MP-1	1988	1995	4.58	0	-100.00%	6.56	2.6	0	0	4
	MP-2	1988	1995	0.19	0.9	373.68%	0.29	0.09	1.66	0.14	2
	MP-3	1988	1995	0.7	4.36	522.86%	1.08	0.32	6.26	2.47	1
	MP-4	1988	1995	1	0.02	-98.00%	1.56	0.44	0.14	-0.11	3
	MP-5	1988	1995	0.62	1.59	156.45%	1.23	0	2.48	0.7	2
	MP-6	1988	1995	1.01	1.65	63.37%	1.45	0.57	3.34	-0.03	2
	MP-A	1988	1995	1.42	1.38	-2.82%	2.21	0.63	2.17	0.6	2
	MP-B	1988	1995	0.88	0.48	-45.45%	1.32	0.44	0.65	0.31	2
	MP-C	1988	1995	0.17	0.32	88.24%	0.42	-0.08	0.41	0.23	2
	MP-D	1988	1995	0.15	0.04	-73.33%	0.24	0.06	0.07	0	2
West-moreland-13	mp-a	1989	1993	0.07	0.06	-14.29%	0.09	0.06	0.1	0	2
	mp-b	1989	1993	0.59	0.23	-61.02%	0.69	0.48	0.29	0.15	3
West-moreland-14	HU-1	1988	1995	0.77	2.64	242.86%	0.91	0.64	3.64	1.64	1
	MP-5A	1988	1995	0	0.02	N/A	0.02	-0.02	0.03	0	2

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West-moreland-15	SLK-GW-27	1994	1999	0.02	0.01	-50.00%	0.03	0	0.03	0	2
West-moreland-16	mp-8	1990	1995	0.3	3.3	1000.00%	0.37	0.24	5.12	1.47	1
West-moreland-18	1	1989	1995	0.34	0.36	5.88%	0.39	0.3	0.44	0.28	2
	2	1989	1995	0.19	0.09	-52.63%	0.26	0.12	0.27	-0.09	2
	3	1989	1995	0.17	0.11	-35.29%	0.24	0.11	0.28	0	2
West-moreland-19	MP16	1993	1999	0.08	0.03	-62.50%	0.09	0.06	0.04	0.02	3
	MP5	1993	1999	0.1	0	-100.00%	0.14	0.07	0	0	4
	MP6	1993	1999	0.08	0.11	37.50%	0.09	0.06	0.18	0.03	2
West-moreland-22	103	1994	1998	0.11	0	-100.00%	0.14	0.08	0	0	4
	69	1994	1998	0.42	0	-100.00%	0.75	0.09	0	0	4
	mp-13	1994	1998	0.03	0	-100.00%	0.24	-0.18	0	0	4
	mp-16	1994	1998	0.04	0	-100.00%	0.06	0.01	0	0	4
<b>Sulfate</b>											
Allegheny-1	10	1986	1995	16.35	44.62	172.91%	52.47	-19.78	160.3	-71.05	2
	2	1986	1995	72.12	10.59	-85.32%	122.38	21.86	15.02	6.16	3
Allegheny-2	S-6	1989	1998	22.72	307.44	1253.17%	34.39	11.04	418.26	196.63	1
	S-7	1989	1989	1244.61	266.69	-78.57%	1521.2	968.02	305.96	227.43	3
Allegheny-3	d-1p	1991	1998	19.4	7.93	-59.12%	27.14	11.66	11.89	3.97	2
Allegheny-4	BS12	1991	1995	343.77	88.47	-74.26%	804.78	-117.24	182.02	-5.08	2
	MD1	1991	1995	202.67	88.88	-56.15%	261.68	143.66	150.33	27.42	2
	MD2	1991	1995	70.92	0	-100.00%	114.68	27.16	4.16	-4.16	3
Allegheny-5	MP-2	1993	1995	16.93	16.31	-3.66%	34.81	-0.95	20.65	11.97	2
Armstrong-1	1A	1984	1990	41.83	34.29	-18.03%	67.92	15.74	55.96	12.62	2
Armstrong-2	D-1	1986	1995	2.42	69.01	2751.65%	13.02	-8.18	136.72	1.31	2
	D-112	1986	1995	3.26	20.56	530.67%	4.63	1.9	67.13	-26	2
	D-4	1986	1995	43.27	30.44	-29.65%	69.89	16.66	56.41	4.48	2
Armstrong-3	w-1A	1986	1992	28.48	80.23	181.71%	35.42	21.54	120.57	39.9	1
	w-2A	1986	1992	13.63	59.2	334.34%	18.41	8.85	102.51	15.88	2
	w-3A	1986	1992	3.7	105.18	2742.70%	4.8	2.6	126.41	83.94	1
Armstrong-4	GK-13	1987	1993	8.33	2.58	-69.03%	12.01	4.65	5.38	-0.21	2
	GK-17	1987	1988	0.03	0	-100.00%	0.17	-0.11	0	0	4
Armstrong-5	MP-2	1988	1993	48.95	3.41	-93.03%	70.64	27.26	8.17	-1.35	3
Armstrong-6	1	1988	1995	137.56	20.75	-84.92%	177.66	97.45	35.76	5.76	3
Armstrong-7	MP14	1988	1997	0.46	3.74	713.04%	0.67	0.24	4.63	2.84	1
	MP15	1988	1997	10.08	46.41	360.42%	16.47	3.69	65.85	26.97	1
	MP17	1988	1997	1.1	25.92	2256.36%	1.28	0.91	43.87	7.97	1
	MP21	1988	1997	0.07	0.32	357.14%	0.12	0.02	0.93	-0.29	2
	MP22	1988	1997	0.11	2.53	2200.00%	0.16	0.06	5.52	-0.46	2
	MP23	1988	1997	0.45	16.95	3666.67%	4.76	-3.86	25.22	8.68	1
	MP24	1988	1997	1.06	1.11	4.72%	2.86	-0.74	1.65	0.58	2

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Armstrong-8	c3-a	1988	1998	21.04	59.9	184.70%	60.05	-17.98	84.17	35.62	2
	md-2	1988	1998	4.62	97.77	2016.23%	10.15	-0.92	137.71	57.83	1
Armstrong-9	HU1	1988	1998	195.5	239.86	22.69%	322.4	68.61	324.3	155.42	2
Armstrong-10	C-11	1989	1995	3.98	5.22	31.16%	4.8	3.15	10.36	-0.12	2
	S-20	1989	1995	56.82	90.44	59.17%	68.1	45.55	112.59	68.28	1
Armstrong-11	HU1	1990	1997	1.17	0	-100.00%	2.69	-0.36	0	0	4
Armstrong-12	mp2	1991	1995	45.44	6.63	-85.41%	83.26	7.63	7.93	5.33	2
	mph	1991	1995	4.96	6.55	32.06%	9.08	0.84	8.45	4.64	2
Armstrong-13	41	1990	1995	17.8	0	-100.00%	21.79	13.81	0.01	-0.01	3
	48	1990	1995	9.33	0	-100.00%	12.51	6.14	0.05	-0.05	3
	Unit 2	1990	1995	312.42	4.94	-98.42%	345.91	278.92	7.17	2.7	3
Armstrong-14	1	1991	1993	27.75	0	-100.00%	35.42	20.08	0	0	4
Armstrong-16	HU1	1993	1998	2.35	7.14	203.83%	3.9	0.8	9.26	5.02	1
Armstrong-17	HU1	1994	1998	0.51	0.54	5.88%	0.95	0.07	0.89	0.19	2
Armstrong-18	D1	1994	1998	1.7	0	-100.00%	2.62	0.77	0	0	4
Beaver-1	S-10	1988	1995	174.39	23.48	-86.54%	211.44	137.35	34.01	12.94	3
Butler-1	5W	1986	1991	162.27	281.84	73.69%	233.31	91.23	427.5	136.19	2
Butler-2	2W	1984	1989	1.88	0	-100.00%	2.33	1.42	0	0	4
	5AW	1984	1989	4.49	116.99	2505.57%	5.96	3.02	169.27	64.7	1
	8W	1984	1989	11.36	40.41	255.72%	18.9	3.82	63.6	17.21	2
Butler-3	S-116	86	1994	117.45	37	-68.50%	144.07	90.82	66.27	7.73	3
	S-13	86	1994	29.13	0	-100.00%	34.81	23.45	0	0	4
	S-200	86	1994	9	37.12	312.44%	18.55	-0.55	84.46	-10.21	2
	S-91	86	1994	7.47	0	-100.00%	9.82	5.12	0	0	4
	S-95/96	86	1994	12.56	5.26	-58.12%	17.7	7.42	11.51	-1	2
Butler-4	DR2	1991	1998	32.65	0	-100.00%	37.19	28.11	0	0	4
Butler-5	1	1991	1998	162.91	264.13	62.13%	200.48	125.35	367.06	161.21	2
Cambria-1	MP 9	1990	1995	18.08	0	-100.00%	25.98	10.17	0	0	4
	Mp 13	1990	1995	35.65	0	-100.00%	50.56	20.74	0	0	4
Clarion-1	SP-1	1985	1995	540.9	111.79	-79.33%	633.8	448	172.58	51	3
	SP-28	1985	1995	219.97	142.8	-35.08%	276.11	163.82	190.45	95.14	2
	SP-5	1985	1995	8.16	0	-100.00%	12.28	4.03	0.3	-0.3	3
	SP-6	1985	1995	74.84	0	-100.00%	134.82	14.85	0	0	4
Clarion-2	1	1986	1989	2.77	0	-100.00%	4.87	0.68	0.31	-0.31	3
Clarion-3	RH-78	1990	1994	0.54	0	-100.00%	0.92	0.15	0	0	4
Clarion-4	1	1990	1996	0	0	N/A	2.27	-2.27	0	0	4
	2	1990	1996	31.35	40.06	27.78%	48.78	13.92	46.12	34	2
Clarion-5	DR-1	1990	1992	19.88	306.33	1440.90%	34.02	5.75	427.54	185.13	1
Clarion-6	1	1992	1998	1.15	0	-100.00%	2.27	0.04	0	0	4
	2	1992	1998	1.95	0	-100.00%	3.03	0.86	0	0	4
	3	1992	1998	8.8	0	-100.00%	12.73	4.87	0	0	4
Clearfield-1	unit 1	1985	1998	318.53	113.2	-64.46%	387.19	249.87	173.83	52.56	3
Clearfield-2	W10	1985	1998	63.04	22.66	-64.05%	114.45	11.63	31.77	13.56	2

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	W42	1985	1998	143.29	51.1	-64.34%	226.07	60.52	74.32	27.87	2
	W43	1985	1998	293.17	208.7	-28.81%	484.05	102.29	288.67	127.46	2
	W44	1985	1998	95.95	56.08	-41.55%	194.56	-2.66	79.96	32.2	2
Clearfield-3	SF-1	1986	1998	3.11	0.98	-68.49%	3.86	2.36	1.78	0.18	3
	SF10	1986	1998	0	0.09	N/A	1.23	-1.23	0.14	0.04	2
	SF4	1986	1998	4.11	0.64	-84.43%	5.94	2.28	1.87	-0.58	3
	SF6	1986	1998	0.31	44.64	14300.00%	5.53	-4.91	67.84	21.43	1
	SF61	1986	1998	16.74	5.79	-65.41%	26.47	7.01	23.25	-11.67	2
Clearfield-4	TK-3	1985	1997	179.92	159.05	-11.60%	206.99	152.86	203.61	114.49	2
	tk-18	1985	1997	125.04	240.43	92.28%	174.87	75.2	305.94	174.92	1
	tk-21	1985	1997	58.65	6.49	-88.93%	86.47	30.83	25.78	-12.81	3
	tk-37	1985	1997	90.44	30.31	-66.49%	113.97	66.91	45.8	14.82	3
	tk-4	1985	1997	7.93	1.52	-80.83%	10.8	5.05	2.13	0.92	3
	tk-7	1985	1997	18.15	0	-100.00%	21.79	14.51	0	0	4
Clearfield-5	SV-5	1988	1992	13.9	19.82	42.59%	15.88	11.91	27.06	12.58	2
	SV-8	1988	1992	29.68	35.54	19.74%	43.09	16.26	69.97	1.11	2
Clearfield-6	R-3	1988	1995	19.28	0.53	-97.25%	26.03	12.53	4.51	-3.46	3
	R-5	1988	1995	15.84	8.43	-46.78%	20.95	10.73	14.08	2.78	2
	R-8	1988	1995	143.19	136.72	-4.52%	163.3	123.07	179.82	93.61	2
Clearfield-7	12	1989	1997	1.93	3.85	99.48%	3.35	0.5	6.71	1	2
	13	1989	1997	290.52	310.11	6.74%	380.4	200.64	393.72	226.51	2
Clearfield-8	TK4	1990	1996	8.83	1.6	-81.88%	11.63	6.04	2.42	0.79	3
	TK7	1990	1996	11.51	0	-100.00%	20.58	2.45	0	0	4
Clearfield-9	1	1990	1994	26.83	0	-100.00%	47.73	5.94	0	0	4
	2	1990	1994	0.33	0	-100.00%	1.34	-0.67	0	0	4
Clearfield-10	HU 1	1992	1998	21.08	19.4	-7.97%	27.11	15.04	29.44	9.37	2
	HU 2	1992	1998	4.4	4.64	5.45%	6.23	2.57	5.82	3.46	2
	HU 3	1992	1998	27.93	16.65	-40.39%	35.69	20.18	24.77	8.52	2
Clearfield-11	subf-a	1993	1994	14.09	17.12	21.50%	20.65	7.53	21.97	12.27	2
	subf-b	1993	1994	8.22	2.72	-66.91%	11.76	4.68	5.72	-0.29	2
	subf-c	1993	1994	26.61	8.31	-68.77%	32.29	20.93	15.04	1.58	3
Clinton-1	13	1981	1995	60.58	0	-100.00%	108.73	12.43	0	0	4
	15A	1981	1995	6.61	0	-100.00%	18.51	-5.29	0	0	4
	96	1981	1995	8.65	0	-100.00%	17.39	-0.08	0	0	4
	97	1981	1995	9.59	0	-100.00%	20.74	-1.55	0	0	4
	SNW 1A	1981	1996	344.25	225.93	-34.37%	502.02	186.49	255.83	196.03	2
Clinton-2	GR-9	1988	1993	45.73	20.26	-55.70%	72.46	19.01	102.41	-61.89	2
Clinton-3	SEH-31	1990	1993	68.76	52.82	-23.18%	115.31	22.22	81.62	24.02	2
	SHE-30	1990	1993	14.52	32.98	127.13%	23.92	5.12	47.26	18.69	2
Fayette-1	mp-4	1989	1993	34.26	10.4	-69.64%	41.9	26.61	10.69	10.11	3
	mp-5	1989	1993	30.65	0	-100.00%	35.98	25.32	0	0	4
	mp-6	1989	1993	5.47	0	-100.00%	10.99	-0.05	0	0	4
	mp-8	1989	1993	36.78	1.14	-96.90%	40.65	32.91	1.15	1.12	3
Fayette-2	HU-1	1984	1992	955.89	448.05	-53.13%	1207.33	704.45	530.84	365.25	3
Fayette-3	MS100	1988	1995	158.66	0.35	-99.78%	190.73	126.59	2.31	-1.61	3
Fayette-4	MP6	1988	1993	6.73	3.22	-52.15%	12.23	1.23	5.53	0.91	2
Fayette-5	mp-4	1988	1998	2297.02	708.19	-69.17%	3795.72	798.32	959.29	457.08	2
	mp-hua	1988	1998	1119.78	539.57	-51.81%	1531.05	708.51	820.34	258.8	2
Fayette-6	MP-1	1988	1994	151.45	223.12	47.32%	224.93	77.98	850.22	-403.98	2
Fayette-7	MP48	1989	1996	735.46	1286.57	74.93%	1143.47	328.44	1605.91	967.24	2

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	MP49	1989	1996	108.52	286.36	163.88%	165.54	51.5	413.41	159.31	2
Fayette-8	MP-15	1988	1994	217.8	367.84	68.89%	322.73	112.88	693.39	42.29	2
Fayette-9	MP-28	1990	1998	245.8	473.19	92.51%	400.45	91.16	640.08	306.3	2
Fayette-10	mp-1	1989	1992	285.84	55.97	-80.42%	330.13	241.56	89.13	22.8	3
	mp-11	1989	1992	84.96	18.15	-78.64%	116.43	53.49	49.56	-13.25	3
	mp-2	1989	1992	14.41	15.07	4.58%	18.96	9.87	22.1	8.05	2
Fayette-11	mp 29	1991	1998	33.76	65.81	94.93%	87.9	-20.38	88.03	43.6	2
Fayette-12	Mp68	1991	1997	10.39	4.76	-54.19%	18.34	2.44	7.88	1.64	2
Fayette-13	D5	1991	1995	30.29	42.96	41.83%	44.7	15.88	49.26	36.67	2
Fayette-14	mp-19	1991	1998	0	0	N/A	2.65	-2.65	0	0	4
	mp-57	1991	1998	12.93	26.87	107.81%	25.11	0.76	58.1	-4.37	2
	mp-60	1991	1998	44.43	58.07	30.70%	94	-5.14	132.99	-16.86	2
	mp56	1991	1998	61.09	382.1	525.47%	132.49	-10.32	886	-121.8	2
Fayette-15	MD1/MD2	1991	1995	9.73	0	-100.00%	42.8	-23.34	0	0	4
	MD8/BS29	1991	1995	8.46	11.81	39.60%	16.88	0.05	14.16	9.46	2
Fayette-16	MP-42	1994	1996	8.39	2.81	-66.51%	13.97	2.81	8.57	-2.95	2
	MP-8	1994	1996	280.52	307.8	9.72%	383.92	177.11	366.2	249.4	2
Greene-1	MP-51	1987	1988	1.86	0	-100.00%	1.86	1.86	0	0	4
Greene-2	hu1	1989	1994	1454.81	101.56	-93.02%	2238.44	671.19	171.51	31.61	3
Indiana-1	H	1988	1995	256.37	335.11	30.71%	345.93	166.81	441.72	228.5	2
	J	1988	1995	152	150.81	-0.78%	218.05	85.94	309.17	-7.55	2
	K	1988	1995	42.49	65.77	54.79%	48.17	36.17	99.71	31.83	2
	L	1988	1995	57.1	2.34	-95.90%	78.35	35.86	30.89	-26.22	3
	M	1988	1995	23.31	63.05	170.48%	38.3	8.32	120.47	5.67	2
	N	1988	1995	6.28	1.47	-76.59%	11.89	0.66	2.56	0.37	2
	O	1988	1995	0	0	N/A	0.08	-0.08	0	0	4
Indiana-2	MP 15	1988	1997	32.32	6.64	-79.46%	41.22	23.42	8.17	5.11	3
	MP 5	1988	1997	280.64	415.5	48.05%	501.73	59.56	694.68	136.33	2
Indiana-3	1 (A)	1992	1998	0	0	N/A	6.71	-6.71	0.79	-0.79	2
	2 (B)	1992	1998	1359.89	182.71	-86.56%	2016.81	702.97	299.61	65.82	3
	3 (C)	1992	1996	901.6	840.32	-6.80%	1388	415.2	1019.61	661.02	2
	4 (D)	1992	1998	279.41	63.79	-77.17%	432.03	126.78	87.33	40.26	3
Indiana-4	1	1992	1998	34.96	30.09	-13.93%	40.73	29.19	39.26	20.92	2
	MP 51	1992	1998	30.82	0	-100.00%	38.16	23.48	0	0	4
	MP 52	1992	1998	19.63	8.13	-58.58%	32.18	7.09	10.67	5.59	2
Jefferson-2	MP-13	1986	1996	7.32	117.06	1499.18%	10.16	4.48	263.62	-29.5	2
Jefferson-3	HU-1	1989	1992	1.37	0	-100.00%	3.36	-0.61	0	0	4
	HU-2	1989	1992	11.41	1.57	-86.24%	48.26	-25.43	2.35	0.78	2
Jefferson-5	MP-33	1989	1998	207	42.74	-79.35%	226.98	187.02	87.47	-1.98	3
	MP-8B	1989	1998	160.44	138.56	-13.64%	206.68	114.2	210.39	66.73	2
Jefferson-6	S-25	1993	1998	2.2	44.92	1941.82%	5.78	-1.37	87.85	1.99	2
	s-34	1993	1998	11.3	0	-100.00%	17.07	5.53	7.84	-7.84	2
Jefferson-7	MP-1	1991	1995	11.88	0.95	-92.00%	15.31	8.46	3.4	-1.5	3
Lawrence-1	1	1992	1998	10.94	0	-100.00%	14.02	7.85	0	0	4
Somerset-1	SP 16	1989	1998	0.91	7.48	721.98%	1.47	0.34	15.11	-0.15	2
Somerset-2	1	1993	1998	96.17	141.8	47.45%	132.01	60.33	165.67	117.93	2
Venango-1	1	1989	1994	53.53	46.16	-13.77%	70.53	36.53	133.65	-41.34	2
Washington-1	HU1	1986	1993	593.85	2519.02	324.18%	759.01	428.69	3237.63	1800.42	1

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Washington-2	A	1985	1998	167.85	84.59	-49.60%	198.99	136.71	125.67	43.52	3
Washington-3	CV103	1985	1998	8369.96	3305.5	-60.51%	9446.53	7293.39	3305.5	3305.5	3
	CV4	1985	1998	1107.28	1189.98	7.47%	1680.24	534.32	1357.27	1022.69	2
Washington-4	MP-1	1989	1998	1891.27	297.08	-84.29%	2361.95	1420.6	424.19	169.97	3
	MP-2	1989	1998	2602.83	0	-100.00%	2998.6	2207.1	0	0	4
Washington-5	d-1	1987	1996	14.86	10.31	-30.62%	24.26	5.46	13.71	6.92	2
Washington-6	D5	1992	1997	584.17	601	2.88%	707.38	460.96	762.56	439.44	2
Washington-7	se1a	1995	1998	2.49	0	-100.00%	4.23	0.76	0	0	4
Westmoreland-1	MP10	1984	1993	101.17	77.16	-23.73%	187.84	14.5	102.55	51.77	2
	MP7	1984	1993	47.7	181.95	281.45%	125.51	-30.1	233.17	130.73	1
Westmoreland-1	MP9	1984	1993	0	7.97	N/A	0.82	-0.82	12.26	3.68	1
Westmoreland-2	S8	1985	1994	192.77	85.18	-55.81%	265.22	120.31	187.77	-17.41	2
Westmoreland-3	CP2	1986	1990	12.62	8.54	-32.33%	18.84	6.4	11.66	5.42	2
	Culvert	1986	1986	5.86	6.49	10.75%	6.32	5.4	9.94	3.04	2
Westmoreland-4	MD-1	1986	1990	76.03	41.83	-44.98%	333.63	-181.58	59.17	24.49	2
	MD-3	1986	1990	15.84	0	-100.00%	122.67	-90.99	0	0	4
	MD-4	1986	1990	32.78	21.46	-34.53%	65.64	-0.08	30.87	12.04	2
	MD-6	1986	1990	493.48	0	-100.00%	935.48	51.48	0	0	4
	MD-7	1986	1990	328.92	59.5	-81.91%	563.98	93.85	93.37	25.63	3
Westmoreland-5	HU-1	1986	1996	1117.86	641.62	-42.60%	1601.29	634.43	900.54	382.7	2
Westmoreland-6	M	1985	1993	62.34	121.18	94.39%	157.63	-32.95	143.16	99.2	2
	N	1985	1993	5.96	2.96	-50.34%	14.6	-2.67	11.07	-5.15	2
Westmoreland-7	MP-3	1986	1991	24.53	2.34	-90.46%	33.54	15.53	3.76	0.93	3
	MP-4	1986	1991	482.45	1238.06	156.62%	728.08	236.82	1718.41	757.71	1
Westmoreland-8	MP-4	1987	1998	4.65	0	-100.00%	8.17	1.14	0	0	4
Westmoreland-9	MP-46	1987	1993	917.57	688.07	-25.01%	1135.08	700.05	808.37	567.76	2
	MP-47	1987	1993	972.18	2728.85	180.69%	1342.1	602.25	3508.84	1948.87	1
	MP-51	1987	1993	18.78	5.77	-69.28%	21.13	16.44	10.28	1.27	3
	MP-52	1987	1993	8.02	19.59	144.26%	10.34	5.7	31.64	7.55	2
	MP-56	1987	1993	36.3	49.58	36.58%	50.69	21.92	105.57	-6.41	2
	MP-60	1987	1993	48.43	24.66	-49.08%	58.37	38.49	44.69	4.63	2
	MP-A	1987	1995	89.82	20.15	-77.57%	111.52	68.12	25.7	14.61	3
Westmoreland-10	MP12	1988	1995	96.47	128.95	33.67%	214.68	-21.74	157.23	100.67	2
Westmoreland-11	MP3	1988	1992	3386.86	3201.9	-5.46%	4387.86	2385.85	3961.25	2442.54	2
Westmoreland-12	MP-1	1988	1995	78.61	0	-100.00%	210.22	-53	0	0	4
	MP-2	1988	1995	7.73	68.42	785.12%	10.57	4.89	107.27	29.58	1
	MP-3	1988	1995	36.09	126.28	249.90%	56.99	15.19	162.88	89.68	1

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	MP-4	1988	1995	77.27	17.73	-77.05%	137.74	16.8	29.58	5.89	2
	MP-5	1988	1995	15.63	90.44	478.63%	67.65	-36.39	127.46	53.42	2
	MP-6	1988	1995	60.51	130.71	116.01%	102.61	18.4	173.81	87.6	2
	MP-A	1988	1995	0.06	19.42	32266.67%	22.35	-22.23	43.08	-4.23	2
	MP-B	1988	1995	0	19.7	N/A	9.53	-9.53	35.23	4.17	2
	MP-C	1988	1995	1.83	18.49	910.38%	5.56	-1.9	31.35	5.64	1
	MP-D	1988	1995	0	0.7	N/A	0.31	-0.31	1.41	-0.01	2
Westmoreland-13	mp-a	1989	1993	14.9	10.06	-32.48%	18.78	11.03	25.39	-5.27	2
	mp-b	1989	1993	105.94	7.77	-92.67%	135.65	76.24	24.56	-9.03	3
Westmoreland-14	HU-1	1988	1995	145.68	142.81	-1.97%	189.91	101.44	171.31	114.3	2
	MP-5A	1988	1995	21.31	2.74	-87.14%	27.82	14.81	4.44	1.03	3
Westmoreland-15	SLK-GW-27	1994	1999	15.89	2.45	-84.58%	19.66	12.12	4.26	0.63	3
Westmoreland-16	mp-8	1990	1995	25.18	62.75	149.21%	33.46	16.89	79.47	46.02	1
Westmoreland-17	SW18	1989	1993	3.89	0	-100.00%	4.28	3.51	0	0	4
Westmoreland-18	1	1989	1995	8.78	4.9	-44.19%	12.99	4.57	6.7	3.1	2
	2	1989	1995	10.96	19.28	75.91%	14.7	7.23	34.18	4.38	2
	3	1989	1995	20.59	8.14	-60.47%	39.32	1.87	12.98	3.3	2
Westmoreland-19	MP16	1993	1999	5.81	3.82	-34.25%	6.52	5.1	5.35	2.29	2
	MP5	1993	1999	5.74	0.44	-92.33%	7.38	4.09	1.55	-0.67	3
	MP6	1993	1999	7.04	0	-100.00%	11.33	2.75	2.65	-2.65	3
Westmoreland-20	mp-7	1991	1998	4.09	14.03	243.03%	5.52	2.65	24	4.06	2
Westmoreland-21	MP3	1992	1997	0.3	4.7	1466.67%	0.46	0.14	6.77	2.63	1
Westmoreland-22	103	1994	1998	14.86	0	-100.00%	20.61	9.1	0	0	4
	69	1994	1998	77.99	0	-100.00%	110.87	45.11	0.39	-0.39	3
	mp-13	1994	1998	6.63	0	-100.00%	33.83	-20.57	0	0	4
	mp-16	1994	1998	3.88	0	-100.00%	7.13	0.64	0	0	4
<b>Flow</b>											
Allegheny-1	10	1986	1995	8	4.5	-43.75%	15.74	0.26	13.04	-4.04	2
	2	1986	1995	10	0.5	-95.00%	16.33	3.67	0.67	0.33	3
Allegheny-2	S-6	1989	1998	2.4	29.7	1137.50%	3.77	1.03	41.26	18.14	1
	S-7	1989	1989	136	29	-78.68%	158.12	113.88	34.38	23.62	3
Allegheny-3	d-1p	1991	1998	2.4	1.2	-50.00%	2.56	2.24	1.6	0.8	3
Allegheny-4	BS12	1991	1995	52.98	15	-71.69%	94.38	11.58	30.31	-0.31	2
	MD1	1991	1995	28.65	14	-51.13%	33.24	24.06	23.77	4.23	3
	MD2	1991	1995	11	0	-100.00%	20.51	1.49	0.87	-0.87	3
Allegheny-5	MP-2	1993	1995	2.5	2.2	-12.00%	4.67	0.33	2.58	1.82	2
Armstrong-1	1A	1984	1990	66	50.13	-24.05%	93.93	38.07	78.47	21.78	2
Armstrong-2	D-1	1986	1995	18	22.38	24.33%	32.04	3.96	45.23	-0.47	2
	D-112	1986	1995	2	14.98	649.00%	2.93	1.07	52.54	-22.58	2
	D-4	1986	1995	25	20.47	-18.12%	38.84	11.16	42.88	-1.94	2
Armstrong-3	w-1A	1986	1992	18.06	13.05	-27.74%	21.75	14.37	17.61	9.39	2
	w-2A	1986	1992	15.33	8	-47.81%	21.07	9.59	14.35	1.65	2
	w-3A	1986	1992	6.72	10	48.81%	8.98	4.46	12.54	7.46	2

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Armstrong-4	GK-13	1987	1993	1.98	0.75	-62.12%	2.93	1.03	1.29	0.21	2
	GK-17	1987	1988	0.02	0	-100.00%	0.11	-0.08	0	0	4
Armstrong-5	MP-2	1988	1993	8.1	0.58	-92.84%	11.83	4.37	1.56	-0.41	3
Armstrong-6	1	1988	1995	10	1	-90.00%	15.89	4.11	1.95	0.05	3
Armstrong-7	MP14	1988	1997	0.1	1.63	1530.00%	0.18	0.02	1.93	1.32	1
	MP15	1988	1997	2.6	13.5	419.23%	4.51	0.69	20.78	6.22	1
	MP17	1988	1997	0.1	3.25	3150.00%	0.15	0.05	5.78	0.72	1
	MP21	1988	1997	0.1	0.63	530.00%	0.13	0.07	1.97	-0.72	2
	MP22	1988	1997	0.1	3.15	3050.00%	0.13	0.07	7.11	-0.81	2
	MP23	1988	1997	0.25	20	7900.00%	7.02	-6.52	33.67	6.33	2
Armstrong-8	MP24	1988	1997	1	1.2	20.00%	1.88	0.12	2.26	0.14	2
	c3-a	1988	1998	7	15.1	115.71%	23.21	-9.21	19.83	10.37	2
Armstrong-9	md-2	1988	1998	2.7	27.1	903.70%	5.49	-0.09	36.45	17.75	1
	HU1	1988	1998	27.73	12.03	-56.62%	43.19	12.26	17.92	6.14	2
Armstrong-10	C-11	1989	1995	0.6	0.5	-16.67%	0.77	0.43	0.7	0.3	2
	S-20	1989	1995	7.1	6.7	-5.63%	8.61	5.59	9.72	3.68	2
Armstrong-11	HU1	1990	1997	0.5	0	-100.00%	1.15	-0.15	0	0	4
Armstrong-12	mp2	1991	1995	6.4	0.95	-85.16%	9.73	3.07	1.25	0.65	3
	mph	1991	1995	0.9	2	122.22%	1.54	0.26	2.81	1.19	2
Armstrong-13	41	1990	1995	2.18	0	-100.00%	2.41	1.94	0.01	-0.01	3
	48	1990	1995	2.48	0	-100.00%	3.15	1.81	0.01	-0.01	3
	Unit 2	1990	1995	13	0.74	-94.31%	15.04	10.96	1.04	0.44	3
Armstrong-14	1	1991	1993	4.5	0	-100.00%	6.11	2.89	0	0	4
Armstrong-15	V2	1992	1997	31.5	0.85	-97.30%	40.3	22.7	1.39	0.31	3
Armstrong-16	HU1	1993	1998	4.1	1.35	-67.07%	9.36	-1.16	1.76	0.94	2
Armstrong-17	HU1	1994	1998	0.3	0.25	-16.67%	0.58	0.02	0.54	-0.04	2
Armstrong-18	D1	1994	1998	1.33	0	-100.00%	2.13	0.52	0	0	4
Beaver-1	S-10	1988	1995	29.7	6.6	-77.78%	34.94	24.46	10.96	2.24	3
Butler-1	5W	1986	1991	70	73	4.29%	110.16	29.83	107.36	38.64	2
Butler-2	2W	1984	1989	2	0	-100.00%	2.42	1.58	0	0	4
	5AW	1984	1989	7.5	13.8	84.00%	10.98	4.02	20.47	7.13	2
	8W	1984	1989	11	2.7	-75.45%	14.9	7.1	4.9	0.5	3
Butler-3	S-116	86	1994	14.06	3.7	-73.68%	18.35	9.77	8.23	-0.83	3
	S-13	86	1994	14.1	0	-100.00%	16.23	11.97	0	0	4
	S-200	86	1994	1.91	11.05	478.53%	4.32	-0.5	21.99	0.11	2
	S-91	86	1994	0.99	0	-100.00%	1.2	0.78	0	0	4
	S-95/96	86	1994	1.46	0.55	-62.33%	2.14	0.77	1.66	-0.56	2
Butler-4	DR2	1991	1998	1.59	0	-100.00%	1.98	1.2	0	0	4
Butler-5	1	1991	1998	86	52.4	-39.07%	108.1	63.9	91.03	13.77	2

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Cambria-1	MP 9	1990	1995	12.4	0	-100.00%	19.42	5.38	0	0	4
	MP 13	1990	1995	30	0	-100.00%	40.68	19.32	0	0	4
Clarion-1	SP-1	1985	1995	25	6	-76.00%	33.45	16.55	9.27	2.73	3
	SP-28	1985	1995	15	9	-40.00%	18.38	11.62	12.93	5.07	2
	SP-5	1985	1995	1	0	-100.00%	1	1	0.11	-0.11	3
	SP-6	1985	1995	3.5	0	-100.00%	5.05	1.95	0	0	4
Clarion-2	1	1986	1989	1.76	0	-100.00%	2.38	1.14	0.13	-0.13	3
Clarion-3	RH-78	1990	1994	3	0	-100.00%	3.61	2.39	0	0	4
Clarion-4	1	1990	1996	0	0	N/A	0.49	-0.49	0	0	4
	2	1990	1996	6	5.35	-10.83%	6.98	5.02	6.19	4.51	2
Clarion-5	DR-1	1990	1992	7.95	16	101.26%	13.93	1.97	21.7	10.3	2
Clarion-6	1	1992	1998	1	0	-100.00%	1.46	0.54	0	0	4
	2	1992	1998	1	0	-100.00%	1.44	0.56	0	0	4
	3	1992	1998	1	0	-100.00%	1.55	0.45	0	0	4
Clearfield-1	unit 1	1985	1998	45.06	13.89	-69.17%	57.49	32.63	23.21	4.57	3
Clearfield-2	W10	1985	1998	5.5	2.2	-60.00%	12.62	-1.62	6.34	-1.62	2
	W42	1985	1998	13.1	3.9	-70.23%	19.84	6.36	5.52	2.28	3
	W43	1985	1998	18	21.3	18.33%	30.22	5.78	30.02	12.58	2
	W44	1985	1998	9.5	12.7	33.68%	20.93	-1.93	18.91	6.49	2
Clearfield-3	SF-1	1986	1998	0.3	0.1	-66.67%	0.38	0.22	0.17	0.03	3
	SF10	1986	1998	0.35	0.07	-80.00%	0.81	-0.11	0.1	0.04	2
	SF4	1986	1998	1	0.1	-90.00%	1.62	0.38	0.52	-0.32	2
	SF6	1986	1998	0.2	2.2	1000.00%	2.53	-2.13	3.7	0.7	2
	SF61	1986	1998	4.35	2.2	-49.43%	6.77	1.93	7.32	-2.92	2
Clearfield-4	TK-3	1985	1997	18	12.4	-31.11%	20.48	15.52	17.59	7.21	2
	tk-18	1985	1997	12	21.7	80.83%	17.36	6.64	27.46	15.94	2
	tk-21	1985	1997	4.5	0.5	-88.89%	6.45	2.55	2.02	-1.02	3
	tk-37	1985	1997	9	4	-55.56%	11.74	6.26	5.32	2.68	3
	tk-4	1985	1997	1.6	0.42	-73.75%	2.24	0.96	0.66	0.18	3
	tk-7	1985	1997	6.5	0	-100.00%	9.14	3.86	0	0	4
Clearfield-5	SV-5	1988	1992	6.3	3.6	-42.86%	8.64	3.96	5.17	2.03	2
	SV-8	1988	1992	8	7.7	-3.75%	12.62	3.38	16.99	-1.59	2
Clearfield-6	R-3	1988	1995	2.95	0.1	-96.61%	4.49	1.4	0.85	-0.65	3
	R-5	1988	1995	3.25	1.1	-66.15%	4.73	1.76	1.62	0.58	3
	R-8	1988	1995	31.8	27.4	-13.84%	38.86	24.73	35.05	19.75	2
Clearfield-7	12	1989	1997	0.3	0.56	86.67%	0.56	0.04	1.19	-0.07	2
	13	1989	1997	37	43.94	18.76%	46.79	27.21	57.55	30.33	2
Clearfield-8	TK4	1990	1996	2.19	0.42	-80.82%	2.68	1.7	0.68	0.16	3
	TK7	1990	1996	3.1	0	-100.00%	5.63	0.57	0	0	4
Clearfield-9	1	1990	1994	6.6	0	-100.00%	9.83	3.37	0	0	4
	2	1990	1994	0.15	0	-100.00%	0.7	-0.4	0	0	4
Clearfield-10	HU 1	1992	1998	8.64	7.15	-17.25%	13.55	3.72	10.99	3.31	2
	HU 2	1992	1998	1	2.11	111.00%	1.83	0.17	2.54	1.68	2
	HU 3	1992	1998	8.68	8.74	0.69%	11.41	5.94	12.1	5.38	2
Clearfield-11	subf-a	1993	1994	2.3	4	73.91%	3.67	0.93	4.56	3.44	2
	subf-b	1993	1994	3	2	-33.33%	4.51	1.49	3.48	0.52	2
	subf-c	1993	1994	7.7	1.8	-76.62%	9.58	5.82	3.37	0.23	3
Clinton-1	13	1981	1995	7	0	-100.00%	11.97	2.03	0	0	4
	15A	1981	1995	10	0	-100.00%	16.1	3.9	0	0	4
	96	1981	1995	2.75	0	-100.00%	4.6	0.9	0.66	-0.66	3

Permit ID	Monitoring Point ID	Permit Baseline Year	Review Year	Baseline Median	Post-Mining Median	% Change In Median	Baseline Upper Limit	Baseline Lower Limit	Post-Mining Upper Limit	Post-Mining Lower Limit	Evaluation
	97	1981	1995	5	0	-100.00%	6.56	3.44	0	0	4
	SNW 1A	1981	1996	36	13.5	-62.50%	45.33	26.67	16.85	10.15	3
Clinton-2	GR-9	1988	1993	8	0.75	-90.63%	12.58	3.42	3.68	-2.18	2
Clinton-3	SEH-31	1990	1993	16.2	12.4	-23.46%	26.28	6.12	17.13	7.67	2
	SHE-30	1990	1993	1	3	200.00%	1.24	0.76	4.06	1.94	1
Fayette-1	mp-4	1989	1993	2.5	0.5	-80.00%	3.13	1.87	0.51	0.49	3
	mp-5	1989	1993	2	0	-100.00%	2.42	1.58	0	0	4
	mp-6	1989	1993	1	0	-100.00%	1	1	0	0	4
	mp-8	1989	1993	2	0.2	-90.00%	2.21	1.79	0.2	0.2	3
Fayette-2	HU-1	1984	1992	27.5	22.75	-17.27%	32.88	22.12	29.15	16.35	2
Fayette-3	MS100	1988	1995	40	0.1	-99.75%	56.59	23.41	1.58	-1.38	3
Fayette-4	MP6	1988	1993	0.9	0.44	-51.11%	2.17	-0.37	0.78	0.09	2
Fayette-5	mp-4	1988	1998	105	35.07	-66.60%	151.13	58.87	54.5	15.64	3
	mp-hua	1988	1998	45.25	35.07	-22.50%	58.47	32.03	54.5	15.64	2
Fayette-6	MP-1	1988	1994	6.1	9.48	55.41%	8.73	3.47	32.43	-13.47	2
Fayette-7	MP48	1989	1996	53.95	69.4	28.64%	86.49	21.41	90.48	48.32	2
	MP49	1989	1996	10.1	19.5	93.07%	15.76	4.44	28.01	10.99	2
Fayette-8	MP-15	1988	1994	6.85	8.64	26.13%	10.13	3.57	18.11	-0.83	2
Fayette-9	MP-28	1990	1998	26.46	50.6	91.23%	54.68	-1.76	69.93	31.27	2
Fayette-10	mp-1	1989	1992	16.03	3.72	-76.79%	18.5	13.56	5.56	1.88	3
	mp-11	1989	1992	8.88	1.81	-79.62%	15.66	2.1	4.61	-1	2
	mp-2	1989	1992	1.35	0.99	-26.67%	1.79	0.91	1.44	0.53	2
Fayette-11	mp 29	1991	1998	4.13	6.6	59.81%	10.56	-2.3	9.07	4.13	2
Fayette-12	Mp68	1991	1997	0.8	0.36	-55.00%	1.63	-0.03	0.78	-0.06	2
Fayette-13	D5	1991	1995	1.5	1.6	6.67%	2.43	0.57	2.21	0.99	2
Fayette-14	mp-19	1991	1998	0	0	N/A	0.51	-0.51	0	0	4
	mp-57	1991	1998	1.7	11.5	576.47%	3.08	0.32	27.76	-4.76	2
	mp-60	1991	1998	8.8	11.2	27.27%	20.18	-2.58	28.36	-5.96	2
	mp56	1991	1998	7.7	25.3	228.57%	15.13	0.27	49.2	1.4	2
Fayette-15	MD1/MD2	1991	1995	2.8	0	-100.00%	8.94	-3.34	0	0	4
	MD8/BS29	1991	1995	1.1	1.2	9.09%	2.05	0.15	1.53	0.87	2
Fayette-16	MP-42	1994	1996	0.9	0.3	-66.67%	1.52	0.28	0.91	-0.31	2
	MP-8	1994	1996	28.6	44.8	56.64%	42.45	14.75	48.7	40.9	2
Greene-1	MP-51	1987	1988	0.01	0	-100.00%	0.01	0.01	0	0	4
Greene-2	hu1	1989	1994	51.5	3.25	-93.69%	68.92	34.08	5.85	0.65	3
Indiana-1	H	1988	1995	27.3	37.9	38.83%	35.46	19.14	49.63	26.17	2
	J	1988	1995	14.6	16.5	13.01%	19.67	9.53	32.77	0.23	2
	K	1988	1995	3.6	5.7	58.33%	4.24	2.96	9.35	2.05	2
	L	1988	1995	4.2	0.25	-94.05%	6.23	2.17	2.89	-2.39	2
	M	1988	1995	3.1	16.5	432.26%	5.31	0.89	23.26	9.74	1
	N	1988	1995	0.8	0.1	-87.50%	1.58	0.02	0.18	0.02	2
	O	1988	1995	0.01	0	-100.00%	0.05	-0.03	0	0	4
Indiana-2	MP 15	1988	1997	8.1	3.05	-62.35%	11.35	4.85	3.65	2.45	3
	MP 5	1988	1997	31.5	35.7	13.33%	58.16	4.84	61.41	9.99	2
Indiana-3	1 (A)	1992	1998	0	0	N/A	0.8	-0.8	0.37	-0.37	2
	2 (B)	1992	1998	93.2	21.7	-76.72%	143.58	42.82	36.23	7.17	3
	3 (C)	1992	1996	55.8	45	-19.35%	94.21	17.39	55.96	34.04	2
	4 (D)	1992	1998	16.5	4.5	-72.73%	26.01	6.99	6.93	2.07	3
Indiana-4	1	1992	1998	16.1	13.05	-18.94%	19.58	12.62	18.6	7.5	2
	MP 51	1992	1998	14.9	0	-100.00%	20.26	9.54	0	0	4

Permit ID	Monitoring Point ID	Permit Baseline Year	Review Year	Baseline Median	Post-Mining Median	% Change In Median	Baseline Upper Limit	Baseline Lower Limit	Post-Mining Upper Limit	Post-Mining Lower Limit	Evaluation
	MP 52	1992	1998	12.1	3.8	-68.60%	20.76	3.44	5.3	2.3	2
Jefferson-2	MP-13	1986	1996	7.16	6	-16.20%	9.74	4.58	7	5	2
Jefferson-3	HU-1	1989	1992	1	0	-100.00%	2.8	-0.8	0	0	4
	HU-2	1989	1992	5.5	0.4	-92.73%	27.34	-16.34	0.6	0.2	2
Jefferson-5	MP-33	1989	1998	12.71	4	-68.53%	13.93	11.5	7.79	0.21	3
	MP-8B	1989	1998	29	27.63	-4.72%	37.1	20.9	46.59	8.67	2
Jefferson-6	S-25	1993	1998	4.7	8.6	82.98%	11.03	-1.63	12.13	5.07	2
	s-34	1993	1998	7.7	0	-100.00%	12.74	2.66	2.35	-2.35	3
Jefferson-7	MP-1	1991	1995	1.8	0.2	-88.89%	2.6	1	0.91	-0.51	3
Lawrence-1	1	1992	1998	4.5	0	-100.00%	6.98	2.02	0	0	4
Somerset-1	SP 16	1989	1998	1	11.75	1075.00%	1.57	0.43	19.53	3.97	1
Somerset-2	1	1993	1998	20	9.8	-51.00%	27.51	12.49	12.03	7.57	3
Venango-1	1	1989	1994	25.8	20	-22.48%	39.92	11.68	62.86	-22.86	2
Washington-1	HU1	1986	1993	26.1	83.83	221.19%	34.32	17.88	113.59	54.06	1
Washington-2	A	1985	1998	19.6	4.75	-75.77%	25.02	14.18	7.94	1.56	3
Washington-3	CV103	1985	1998	580	500	-13.79%	648.27	511.73	500	500	3
	CV4	1985	1998	100	90	-10.00%	148.38	51.62	96.36	83.64	2
Washington-4	MP-1	1989	1998	151.65	34.7	-77.12%	218.62	84.68	49.26	20.14	3
	MP-2	1989	1998	132	0	-100.00%	155.67	108.73	0	0	4
Washington-5	d-1	1987	1996	2.4	1.2	-50.00%	2.4	2.4	1.52	0.88	3
Washington-6	D5	1992	1997	40	30	-25.00%	49.12	30.88	34.06	25.94	2
Washington-7	se1a	1995	1998	0.38	0	-100.00%	1.27	-0.52	0	0	4
Westmoreland-1	MP10	1984	1993	13.95	8.3	-40.50%	18.1	9.8	12.32	4.28	2
	MP7	1984	1993	6.25	16.9	170.40%	16.73	-4.23	21.18	12.62	2
	MP9	1984	1993	0.29	0.9	210.34%	0.52	0.05	1.31	0.49	2
Westmoreland-2	S8	1985	1994	31.5	8.1	-74.29%	40.8	22.2	18.08	-1.88	3
Westmoreland-3	CP2	1986	1990	1	0.75	-25.00%	1.35	0.65	1.03	0.47	2
	Culvert	1986	1986	1	1	0.00%	1.34	0.66	1.54	0.46	2
Westmoreland-4	MD-1	1986	1990	7	3	-57.14%	27.11	-13.11	4.22	1.78	2
	MD-3	1986	1990	2.05	0	-100.00%	16.21	-12.11	0	0	4
	MD-4	1986	1990	4.5	3	-33.33%	8.3	0.7	4.22	1.78	2
	MD-6	1986	1990	41.5	0	-100.00%	105.9	-22.9	0	0	4
	MD-7	1986	1990	29.8	6	-79.87%	55.12	4.48	8.84	3.16	2
Westmoreland-5	HU-1	1986	1996	106	69.95	-34.01%	162.68	49.32	92.5	47.4	2
Westmoreland-6	M	1985	1993	12.92	11.7	-9.44%	20.99	4.85	14.3	9.1	2
	N	1985	1993	3.38	0.65	-80.77%	6.16	0.59	1.38	-0.08	2
Westmoreland-7	MP-3	1986	1991	4.25	1	-76.47%	5.23	3.27	1.41	0.59	3
	MP-4	1986	1991	61.1	120	96.40%	93.89	28.31	148	92	2
Westmoreland-8	MP-4	1987	1998	2	0	-100.00%	2	2	0	0	4

Permit ID	Monitoring Point ID	Permit Baseline Year	Review Year	Baseline Median	Post-Mining Median	% Change In Median	Baseline Upper Limit	Baseline Lower Limit	Post-Mining Upper Limit	Post-Mining Lower Limit	Evaluation
Westmoreland-9	MP-46	1987	1993	78.5	84.5	7.64%	98.75	58.25	105.99	63.01	2
	MP-47	1987	1993	102.7	288.1	180.53%	140.31	65.09	360.96	215.24	1
	MP-51	1987	1993	3.95	1.72	-56.46%	4.62	3.28	3.63	-0.19	2
	MP-52	1987	1993	1.19	3.5	194.12%	1.63	0.74	5.93	1.07	2
	MP-56	1987	1993	8.2	11.05	34.76%	11.49	4.91	23.83	-1.73	2
	MP-60	1987	1993	8.1	5.25	-35.19%	9.71	6.49	9.55	0.95	2
	MP-A	1987	1995	9.3	2.9	-68.82%	11.76	6.84	4.92	0.88	3
Westmoreland-10	MP12	1988	1995	6.9	7.2	4.35%	19.55	-5.75	11.58	2.82	2
Westmoreland-11	MP3	1988	1992	371.33	321.4	-13.45%	474.26	268.4	386.85	255.95	2
Westmoreland-12	MP-1	1988	1995	4	0	-100.00%	12.01	-4.01	0	0	4
	MP-2	1988	1995	0.88	2.9	229.55%	1.32	0.43	4.15	1.65	1
	MP-3	1988	1995	2.99	5.1	70.57%	5.21	0.77	6.05	4.15	2
	MP-4	1988	1995	4	0.54	-86.50%	7.9	0.1	0.93	0.15	2
	MP-5	1988	1995	1.1	5.1	363.64%	4.79	-2.59	7.38	2.82	2
	MP-6	1988	1995	4.7	8.1	72.34%	7.53	1.87	11.7	4.5	2
	MP-A	1988	1995	0.06	2.19	3550.00%	2.19	-2.08	4.34	0.03	2
	MP-B	1988	1995	0	2.19	N/A	0.78	-0.78	3.42	0.95	1
	MP-C	1988	1995	0.18	1.5	733.33%	0.54	-0.19	2.64	0.36	2
	MP-D	1988	1995	0	0.2	N/A	0.06	-0.06	0.38	0.02	2
Westmoreland-13	mp-a	1989	1993	1.1	0.8	-27.27%	1.39	0.81	2.22	-0.62	2
	mp-b	1989	1993	4.8	0.5	-89.58%	6.11	3.49	1.72	-0.72	3
Westmoreland-14	HU-1	1988	1995	43.6	31.62	-27.48%	65.28	21.92	38.41	24.83	2
	MP-5A	1988	1995	3	0.31	-89.67%	3.82	2.18	0.52	0.1	3
Westmoreland-15	SLK-GW-27	1994	1999	1.9	0.4	-78.95%	2.38	1.42	0.71	0.09	3
Westmoreland-16	mp-8	1990	1995	2.75	8.3	201.82%	3.58	1.92	10.69	5.91	1
Westmoreland-17	SW18	1989	1993	1.2	0	-100.00%	1.38	1.02	0	0	4
Westmoreland-18	1	1989	1995	2.5	0.48	-80.80%	3.19	1.81	0.79	0.16	3
	2	1989	1995	2.5	2.78	11.20%	3.22	1.78	4.92	0.63	2
	3	1989	1995	2.8	1.4	-50.00%	5.78	-0.18	2.44	0.35	2
Westmoreland-19	MP16	1993	1999	1.5	1.7	13.33%	1.74	1.26	2.53	0.87	2
	MP5	1993	1999	1.4	0.2	-85.71%	1.99	0.81	1.09	-0.69	2
	MP6	1993	1999	1.2	0.1	-91.67%	1.97	0.43	1.03	-0.83	2
Westmoreland-20	mp-7	1991	1998	3.05	1.22	-60.00%	4.04	2.06	2.39	0.05	2
Westmoreland-21	MP3	1992	1997	1	8.62	762.00%	1.93	0.07	16.27	0.96	2
Westmoreland-22	103	1994	1998	8.3	0	-100.00%	12.16	4.44	0	0	4
	69	1994	1998	35.3	0	-100.00%	50.21	20.39	0.4	-0.4	3
	mp-13	1994	1998	3.45	0	-100.00%	12.47	-5.57	0	0	4
	mp-16	1994	1998	0.5	0	-100.00%	1.08	-0.08	0	0	4

The site-by-site statistical comparisons and mine compliance history suggest that remining is conducted with little risk of worsening water quality. However, those data do not provide insights into the broader overall, statewide water quality impacts. The calculations in Table B.2 are derived from the summary numbers for each water quality parameter in Table B.1. The baseline median loads and post-mining median loads for all discharges are each totaled, and then the sum of the baseline load is subtracted from the post-mining load. Table B.2 shows the results in pounds per day (lbs/day) and the percent change in median loads for the cumulative effects of all the remining discharges. The summary numbers shown in Table B.2 provide insights that are not readily evident from the statistical summaries. For example, the first discharge listed in Table B.1 (permit Allegheny-1, MP ID 10) showed no statistical difference in load despite the fact that the post-mining median load was 2.5 times higher than the baseline median load. The summations depicted in Table B.2 show that even though some median loads have increased, overall there has been a decrease in load, particularly acid load. The decreases on a yearly basis are substantial. Table B.2 suggests that remining has decreased the acid load to streams in Pennsylvania's bituminous coal region by over 5.8 million pounds per year. The annual reductions in metals loads are more modest, but nonetheless important. Iron, manganese and aluminum loads have been reduced by 189,000, 11,400, and 110,400 lbs/yr respectively. These calculations confirm that there has been a substantial cumulative improvement in water quality across the bituminous region as a result of remining.

**Table B.2 : Summary of load data for select water quality parameters (PA Remining Database).**

Parameter	# of Mines	# of Discharges	Total Baseline Median Load	Total Post-Mining Load	Total Change in Load (lbs/day)*	% Change in Median*
Acidity	109	236	26,092	10,174	-15,918	-61
Aluminum	57	121	702	399	-302	-43.09
Iron	104	220	1,485	968	-517	-35
Manganese	75	164	247	216	-31	-13

\* Negative numbers indicate a reduction in load.

In addition to showing the overall environmental benefits of remining, the documentation of

BMPs used upgradient from discharges has permitted an evaluation of the effectiveness of individual and composite BMPs. This is the largest database currently available for evaluation of BMP effectiveness. Twelve BMPs were selected for evaluation because they were commonly used or there is a potential for increased use in the future. These BMPs are listed below and are defined in Section 6 of this manual. The number of discharges affected by each BMP are indicated in parentheses:

- Surface regrading of spoil (156)
- Revegetation (177)
- Deep mine daylighting (170)
- Special handling of acid-forming materials (80)
- Alkaline addition at < 100 tons/acre (67)
- Special water handling facilities (23)
- Passive treatment system construction (2)
- Coal refuse removal (9)
- Biosolids application (6)
- Mining high alkaline strata (13)
- Alkaline addition at >100 tons/acre (11)
- On-site alkaline redistribution (6)

Table B.3 shows the BMPs affecting each discharge point. Multiple BMPs are routinely used in an attempt to improve discharges. Evaluation of the effectiveness of these BMPs in terms of observed outcome and statistical analysis is presented in Section 6.

**Table B.3: BMPs affecting each Monitoring Point**

Permit ID	Monitoring Point ID	BMPs Applied
Allegheny-1	10	Surface regrading and Surface revegetation
	2	Surface regrading and Surface revegetation
Allegheny-2	S-6	Daylighting deep mines, Surface regrading, and Surface revegetation
	S-7	Daylighting deep mines, Surface regrading, and Surface revegetation
Allegheny-3	d-1p	Daylighting deep mines, Surface regrading, and Surface revegetation
Allegheny-4	BS12	Daylighting deep mines, Special handling of acid-forming material, Surface regrading, and Surface revegetation

Permit ID	Monitoring Point ID	BMPs Applied
	MD1	Special handling of acid-forming material, Surface regrading, and Surface revegetation
	MD2	Daylighting deep mines, Special handling of acid-forming material, Surface regrading, and Surface revegetation
Allegheny-5	MP-2	Daylighting deep mines, Surface regrading, and Surface revegetation
Armstrong-1	1A	Surface regrading and Surface revegetation
Armstrong-2	D-1	Alkaline addition (less than 100 tons/acre) and Daylighting deep mines
	D-112	Alkaline addition (less than 100 tons/acre) and Daylighting deep mines
	D-4	Alkaline addition (less than 100 tons/acre) and Daylighting deep mines
Armstrong-3	w-1A	Daylighting deep mines and Special handling of acid-forming material
	w-2A	Daylighting deep mines and Special handling of acid-forming material
	w-3A	Daylighting deep mines and Special handling of acid-forming material
Armstrong-4	GK-13	Surface regrading and Surface revegetation
	GK-17	Surface regrading and Surface revegetation
Armstrong-5	MP-2	Daylighting deep mines, Surface regrading, and Surface revegetation
Armstrong-6	1	Alkaline addition (less than 100 tons/acre), Construction of special water handling facilities, Daylighting deep mines, and Special handling of acid-forming material
Armstrong-7	MP14	Daylighting deep mines, Special handling of acid-forming material, Surface regrading, and Surface revegetation
	MP15	Daylighting deep mines, Special handling of acid-forming material, Surface regrading, and Surface revegetation
	MP17	Daylighting deep mines, Special handling of acid-forming material, Surface regrading, and Surface revegetation
Armstrong-7	MP21	Daylighting deep mines, Special handling of acid-forming material, Surface regrading, and Surface revegetation
	MP22	Daylighting deep mines, Special handling of acid-forming material, Surface regrading, and Surface revegetation
	MP23	Daylighting deep mines, Special handling of acid-forming material, Surface regrading, and Surface revegetation
	MP24	Passive treatment system construction, Surface regrading, and Surface revegetation
Armstrong-8	c3-a	Coal refuse removal, Special handling of acid-forming material, Surface regrading, and Surface revegetation
	md-2	Daylighting deep mines and Special handling of acid-forming material
Armstrong-9	HU1	Special handling of acid-forming material, Surface regrading, and Surface revegetation
Armstrong-10	C-11	Daylighting deep mines and Other (see comment field)
	S-20	Daylighting deep mines and Other (see comment field)
Armstrong-11	HU1	Daylighting deep mines, Surface regrading, and Surface revegetation
Armstrong-12	mp2	Special handling of acid-forming material, Surface regrading, and Surface revegetation
	mph	Special handling of acid-forming material, Surface regrading, and Surface revegetation

Permit ID	Monitoring Point ID	BMPs Applied
Armstrong-13	41	Biosolids application, Daylighting deep mines, Surface regrading, and Surface revegetation
	48	Daylighting deep mines, Passive treatment system construction, and Surface revegetation
	Unit 2	Daylighting deep mines, Surface regrading, and Surface revegetation
Armstrong-14	1	Daylighting deep mines, Surface regrading, and Surface revegetation
Armstrong-15	V2	Daylighting deep mines, Surface regrading, and Surface revegetation
Armstrong-16	HU1	Daylighting deep mines, Mining and handling of highly alkaline strata, Other (see comment field), Surface regrading, and Surface revegetation,
Armstrong-17	HU1	Surface regrading and Surface revegetation
Armstrong-18	D1	Alkaline addition (less than 100 tons/acre), Daylighting deep mines, and Other (see comment field)
Beaver-1	S-10	Daylighting deep mines, Other (see comment field), Surface regrading, and Surface revegetation
Butler-1	5W	Construction of special water handling facilities, Daylighting deep mines, Surface regrading, and Surface revegetation
Butler-2	2W	Surface regrading and Surface revegetation
	5AW	Surface regrading and Surface revegetation
	8W	Surface regrading and Surface revegetation
Butler-3	S-116	Alkaline addition (less than 100 tons/acre), Daylighting deep mines, Surface regrading, and Surface revegetation
	S-13	Alkaline addition (less than 100 tons/acre), Daylighting deep mines, Special handling of acid-forming material, Surface regrading, and Surface revegetation
	S-200	Alkaline addition (less than 100 tons/acre), Daylighting deep mines, and Surface revegetation
	S-91	Alkaline addition (less than 100 tons/acre), Daylighting deep mines, and Surface revegetation
	S-95/96	Alkaline addition (less than 100 tons/acre), Daylighting deep mines, and Surface revegetation
Butler-4	DR2	Alkaline addition (less than 100 tons/acre), Construction of special water handling facilities, and Daylighting deep mines
Butler-5	1	Alkaline addition (less than 100 tons/acre) and Daylighting deep mines
Cambria-1	MP9	Alkaline addition (less than 100 tons/acre), Construction of special water handling facilities, Daylighting deep mines, and Mining and handling of highly alkaline strata
	MP 13	Alkaline addition (less than 100 tons/acre), Construction of special water handling facilities, Daylighting deep mines, and Mining and handling of highly alkaline strata
Clarion-1	SP-1	Construction of special water handling facilities, Surface regrading, and Surface revegetation
	SP-28	Construction of special water handling facilities, Surface regrading, and Surface revegetation
	SP-5	Construction of special water handling facilities, Surface regrading, and Surface revegetation
	SP-6	Construction of special water handling facilities, Surface regrading, and Surface revegetation

Permit ID	Monitoring Point ID	BMPs Applied
Clarion-2	1	Alkaline addition (less than 100 tons/acre), Construction of special water handling facilities, Surface regrading, and Surface revegetation
Clarion-3	RH-78	Daylighting deep mines, Surface regrading, and Surface revegetation
Clarion-4	1	Construction of special water handling facilities, Daylighting deep mines, Surface regrading, and Surface revegetation
	2	Construction of special water handling facilities, Daylighting deep mines, Surface regrading, and Surface revegetation
Clarion-5	DR-1	Alkaline addition (greater than 100 tons/acre), Special handling of acid-forming material, Surface regrading, and Surface revegetation
Clarion-6	1	Surface regrading and Surface revegetation
	2	Surface regrading and Surface revegetation
	3	Surface regrading and Surface revegetation
Clearfield-1	unit 1	Other (see comment field)
Clearfield-2	W10	Alkaline addition (less than 100 tons/acre), Surface regrading, and Surface revegetation
	W42	Alkaline addition (less than 100 tons/acre), Surface regrading, and Surface revegetation
	W43	Alkaline addition (less than 100 tons/acre), Surface regrading, and Surface revegetation
	W44	Alkaline addition (less than 100 tons/acre), Surface regrading, and Surface revegetation
Clearfield-3	SF-1	Alkaline addition (less than 100 tons/acre), Daylighting deep mines, Surface regrading, and Surface revegetation
	SF10	Alkaline addition (less than 100 tons/acre), Daylighting deep mines, Other (see comment field), Special handling of acid-forming material, Surface regrading, and Surface revegetation
	SF4	Alkaline addition (less than 100 tons/acre), Daylighting deep mines, Other (see comment field), Special handling of acid-forming material, Surface regrading, and Surface revegetation
	SF6	Alkaline addition (less than 100 tons/acre), Daylighting deep mines, Other (see comment field), Special handling of acid-forming material, Surface regrading, and Surface revegetation
	SF61	Alkaline addition (less than 100 tons/acre), Daylighting deep mines, Other (see comment field), Special handling of acid-forming material, Surface regrading, and Surface revegetation
Clearfield-4	TK-3	Surface revegetation
	tk-18	Surface revegetation
	tk-21	Surface revegetation
	tk-37	Surface revegetation
	tk-4	Surface revegetation
	tk-7	Biosolids application and Surface revegetation
Clearfield-5	SV-5	Alkaline addition (less than 100 tons/acre), Special handling of acid-forming material, and Surface regrading
	SV-8	Alkaline addition (less than 100 tons/acre), Special handling of acid-forming material, and Surface revegetation

Permit ID	Monitoring Point ID	BMPs Applied
Clearfield-6	R-3	Daylighting deep mines, Mining and handling of highly alkaline strata, and Surface regrading
	R-5	Daylighting deep mines, Mining and handling of highly alkaline strata, and Surface regrading
	R-8	Coal refuse removal, Daylighting deep mines, and Mining and handling of highly alkaline strata
Clearfield-7	12	Daylighting deep mines, Special handling of acid-forming material, Surface regrading, and Surface revegetation
	13	Daylighting deep mines, Special handling of acid-forming material, Surface regrading, and Surface revegetation
Clearfield-8	TK4	Alkaline addition (greater than 100 tons/acre), Biosolids application, Surface regrading, and Surface revegetation
	TK7	Alkaline addition (greater than 100 tons/acre), Biosolids application, Surface regrading, and Surface revegetation
Clearfield-9	1	Alkaline addition (less than 100 tons/acre), Daylighting deep mines, and Special handling of acid-forming material
	2	Alkaline addition (less than 100 tons/acre), Daylighting deep mines, and Special handling of acid-forming material
Clearfield-10	HU 1	Daylighting deep mines, Surface regrading, and Surface revegetation
	HU 2	Daylighting deep mines, Surface regrading, and Surface revegetation
	HU 3	Daylighting deep mines, Surface regrading, and Surface revegetation
Clearfield-11	subf-a	Alkaline addition (less than 100 tons/acre), Daylighting deep mines, Mining and handling of highly alkaline strata, Surface regrading, and Surface revegetation
	subf-b	Alkaline addition (less than 100 tons/acre), Daylighting deep mines, Mining and handling of highly alkaline strata, Surface regrading, and Surface revegetation
	subf-c	Alkaline addition (less than 100 tons/acre), Daylighting deep mines, Mining and handling of highly alkaline strata, Surface regrading, and Surface revegetation
Clinton-1	96	Alkaline addition (greater than 100 tons/acre), Surface regrading, and Surface revegetation
	97	Alkaline addition (greater than 100 tons/acre), Surface regrading, and Surface revegetation
	13	Alkaline addition (greater than 100 tons/acre), Daylighting deep mines, and Surface revegetation
	15A	Alkaline addition (greater than 100 tons/acre), Daylighting deep mines, Surface regrading, and Surface revegetation
	SNW 1A	Alkaline addition (greater than 100 tons/acre), Biosolids application, Daylighting deep mines, and Surface regrading
Clinton-2	GR-9	Alkaline addition (greater than 100 tons/acre), Daylighting deep mines, and Special handling of acid-forming material
	SEH-31	Alkaline addition (greater than 100 tons/acre), Special handling of acid-forming material, and Surface revegetation
	SHE-30	Alkaline addition (greater than 100 tons/acre), Special handling of acid-forming material, and Surface regrading
Fayette-1	mp-4	Daylighting deep mines and Surface revegetation
	mp-5	Daylighting deep mines and Surface revegetation
	mp-6	Daylighting deep mines and Surface revegetation

Permit ID	Monitoring Point ID	BMPs Applied
	mp-8	Daylighting deep mines and Surface revegetation
Fayette-2	HU-1	Alkaline addition (less than 100 tons/acre), Biosolids application, Coal refuse removal, Special handling of acid-forming material, Surface regrading, and Surface revegetation
Fayette-3	MS100	Coal refuse removal, Surface regrading, and Surface revegetation
Fayette-4	MP6	Daylighting deep mines, Surface regrading, and Surface revegetation
Fayette-5	mp-4	Daylighting deep mines, Special handling of acid-forming material, Surface regrading, and Surface revegetation
	mp-hua	Daylighting deep mines, Special handling of acid-forming material, Surface regrading, and Surface revegetation
Fayette-6	MP-1	Coal refuse removal, Special handling of acid-forming material, Surface regrading, and Surface revegetation
Fayette-7	MP48	Daylighting deep mines, Surface regrading, and Surface revegetation
	MP49	Daylighting deep mines, Surface regrading, and Surface revegetation
Fayette-8	MP-15	Coal refuse removal, Special handling of acid-forming material, Surface regrading, and Surface revegetation
Fayette-9	MP-28	Daylighting deep mines, Surface regrading, and Surface revegetation
Fayette-10	mp-1	Daylighting deep mines, Special handling of acid-forming material, and Surface revegetation
	mp-11	Daylighting deep mines, Special handling of acid-forming material, and Surface revegetation
	mp-2	Daylighting deep mines and Surface revegetation
Fayette-11	mp 29	Daylighting deep mines, Other (see comment field), and Special handling of acid-forming material
Fayette-12	Mp68	Daylighting deep mines
Fayette-13	D5	Daylighting deep mines, Surface regrading, and Surface revegetation
Fayette-14	mp-19	Construction of special water handling facilities, Daylighting deep mines, Special handling of acid-forming material, Surface regrading, and Surface revegetation
	mp-57	Construction of special water handling facilities, Daylighting deep mines, Special handling of acid-forming material, Surface regrading, and Surface revegetation
	mp-60	Construction of special water handling facilities, Daylighting deep mines, Special handling of acid-forming material, Surface regrading, and Surface revegetation
	mp56	Construction of special water handling facilities, Daylighting deep mines, Special handling of acid-forming material, Surface regrading, and Surface revegetation
Fayette-15	MD1/MD2	Daylighting deep mines, Surface regrading, and Surface revegetation
	MD8/BS29	Daylighting deep mines, Surface regrading, and Surface revegetation
Fayette-16	MP-42	Daylighting deep mines
	MP-8	Daylighting deep mines
Greene-1	MP-51	Surface regrading and Surface revegetation
Greene-2	hu 1	Mining and handling of highly alkaline strata, Special handling of acid-forming material, Surface regrading, and Surface revegetation
Indiana-1	H	Alkaline addition (less than 100 tons/acre) and Daylighting deep mines

Permit ID	Monitoring Point ID	BMPs Applied
	J	Alkaline addition (less than 100 tons/acre) and Daylighting deep mines
	K	Alkaline addition (less than 100 tons/acre) and Daylighting deep mines
	L	Alkaline addition (less than 100 tons/acre) and Daylighting deep mines
	M	Alkaline addition (less than 100 tons/acre) and Daylighting deep mines
	N	Alkaline redistribution from on-site sources and Daylighting deep mines
	O	Alkaline addition (less than 100 tons/acre) and Daylighting deep mines
Indiana-2	1	Alkaline addition (less than 100 tons/acre), Daylighting deep mines, Other (see comment field), Special handling of acid-forming material, Surface regrading, and Surface revegetation
	2	Alkaline addition (less than 100 tons/acre), Daylighting deep mines, Other (see comment field), Special handling of acid-forming material, Surface regrading, and Surface revegetation
Indiana-3	1 (A)	Daylighting deep mines, Special handling of acid-forming material, Surface regrading, and Surface revegetation
	2 (B)	Daylighting deep mines, Special handling of acid-forming material, Surface regrading, and Surface revegetation
	3 (C)	Daylighting deep mines, Special handling of acid-forming material, Surface regrading, and Surface revegetation
	4 (D)	Daylighting deep mines, Special handling of acid-forming material, Surface regrading, and Surface revegetation
Indiana-4	1	Alkaline addition (less than 100 tons/acre), Daylighting deep mines, Special handling of acid-forming material, Surface regrading, and Surface revegetation
	MP 51	Alkaline addition (less than 100 tons/acre), Daylighting deep mines, Special handling of acid-forming material, Surface regrading, and Surface revegetation
	MP 52	Alkaline addition (less than 100 tons/acre), Daylighting deep mines, Special handling of acid-forming material, Surface regrading, and Surface revegetation
Jefferson-2	MP-13	Alkaline addition (less than 100 tons/acre), Daylighting deep mines, and Surface revegetation
Jefferson-3	HU-1	Alkaline redistribution from on-site sources, Daylighting deep mines, Surface regrading, and Surface revegetation
Jefferson-5	MP-33	Alkaline addition (less than 100 tons/acre), Daylighting deep mines, Special handling of acid-forming material, Surface regrading, and Surface revegetation
	MP-8B	Alkaline addition (less than 100 tons/acre), Daylighting deep mines, Special handling of acid-forming material, Surface regrading, and Surface revegetation
Jefferson-6	S-25	Other (see comment field) and Surface regrading
	s-34	Surface regrading and Surface revegetation
Jefferson-7	MP-1	Surface regrading and Surface revegetation
Lawrence-1	1	Alkaline addition (less than 100 tons/acre), Daylighting deep mines, Other (see comment field), Surface regrading, and Surface revegetation
Somerset-1	SP 16	Construction of special water handling facilities, Other (see comment field), Special handling of acid-forming material, Surface regrading, Surface revegetation
Somerset-2	1	Daylighting deep mines, Special handling of acid-forming material, Mining and handling of highly alkaline material

Permit ID	Monitoring Point ID	BMPs Applied
Venango-1	1	Construction of special water handling facilities, Daylighting deep mines, Special handling of acid-forming material, Surface regrading, and Surface revegetation
Washington-1	HU1	Daylighting deep mines, Surface regrading, and Surface revegetation
Washington-2	A	Daylighting deep mines
Washington-3	CV103	Daylighting deep mines, Mining and handling of highly alkaline strata, and Special handling of acid-forming material
	CV4	Daylighting deep mines, Mining and handling of highly alkaline strata, and Special handling of acid-forming material
Washington-4	MP-1	Daylighting deep mines, Surface regrading, and Surface revegetation
	MP-2	Daylighting deep mines, Surface regrading, and Surface revegetation
Washington-5	d-1	Daylighting deep mines, Surface regrading, and Surface revegetation
Washington-6	D5	Daylighting deep mines
Washington-7	se1a	Daylighting deep mines, Special handling of acid-forming material, and Surface regrading
Westmoreland-1	MP10	Alkaline addition (less than 100 tons/acre), Daylighting deep mines, and Special handling of acid-forming material
	MP7	Alkaline addition (less than 100 tons/acre), Daylighting deep mines, and Special handling of acid-forming material
	MP9	Alkaline addition (less than 100 tons/acre), Daylighting deep mines, and Special handling of acid-forming material
Westmoreland-2	S8	Alkaline addition (less than 100 tons/acre) and Daylighting deep mines
Westmoreland-3	CP2	Coal refuse removal, Surface regrading, and Surface revegetation
	Culvert t	Coal refuse removal, Surface regrading, and Surface revegetation
Westmoreland-4	MD-1	Alkaline addition (less than 100 tons/acre), Daylighting deep mines, Special handling of acid-forming material, and Surface revegetation
	MD-3	Alkaline addition (less than 100 tons/acre), Daylighting deep mines, Special handling of acid-forming material, and Surface revegetation
	MD-4	Alkaline addition (less than 100 tons/acre), Daylighting deep mines, Special handling of acid-forming material, and Surface revegetation
	MD-6	Alkaline addition (less than 100 tons/acre), Daylighting deep mines, Special handling of acid-forming material, and Surface revegetation
	MD-7	Alkaline addition (less than 100 tons/acre), Daylighting deep mines, Special handling of acid-forming material, and Surface revegetation
Westmoreland-5	HU-1	Daylighting deep mines
Westmoreland-6	M	Coal refuse removal and Daylighting deep mines
	N	Daylighting deep mines
Westmoreland-7	MP-3	Daylighting deep mines, Special handling of acid-forming material, Surface regrading, and Surface revegetation
	MP-4	Daylighting deep mines, Special handling of acid-forming material, Surface regrading, and Surface revegetation
Westmoreland-8	MP-4	Daylighting deep mines

Permit ID	Monitoring Point ID	BMPs Applied
Westmoreland-9	MP-46	Daylighting deep mines, Surface regrading, and Surface revegetation
	MP-47	Daylighting deep mines, Surface regrading, and Surface revegetation
	MP-51	Daylighting deep mines, Surface regrading, and Surface revegetation
	MP-52	Daylighting deep mines, Surface regrading, and Surface revegetation
	MP-56	Daylighting deep mines, Surface regrading, and Surface revegetation
	MP-60	Daylighting deep mines, Surface regrading, and Surface revegetation
	MP-A	Daylighting deep mines, Surface regrading, and Surface revegetation
Westmoreland-10	MP12	Daylighting deep mines, Surface regrading, and Surface revegetation
Westmoreland-11	MP3	Daylighting deep mines, Surface regrading, and Surface revegetation
Westmoreland-12	MP-1	Alkaline addition (less than 100 tons/acre), Daylighting deep mines, Surface regrading, and Surface revegetation
	MP-2	Alkaline addition (less than 100 tons/acre), Daylighting deep mines, Surface regrading, and Surface revegetation
	MP-3	Alkaline addition (less than 100 tons/acre), Daylighting deep mines, Surface regrading, and Surface revegetation
	MP-4	Alkaline addition (less than 100 tons/acre), Daylighting deep mines, Surface regrading, and Surface revegetation
	MP-5	Alkaline addition (less than 100 tons/acre), Daylighting deep mines, Surface regrading, and Surface revegetation
	MP-6	Alkaline addition (less than 100 tons/acre), Daylighting deep mines, Surface regrading, and Surface revegetation
	MP-A	Alkaline addition (less than 100 tons/acre), Daylighting deep mines, Surface regrading, and Surface revegetation
	MP-B	Alkaline addition (less than 100 tons/acre), Daylighting deep mines, Surface regrading, and Surface revegetation
	MP-C	Alkaline addition (less than 100 tons/acre), Daylighting deep mines, Surface regrading, and Surface revegetation
	MP-D	Alkaline addition (less than 100 tons/acre), Daylighting deep mines, Surface regrading, and Surface revegetation
Westmoreland-13	mp-a	Surface regrading and Surface revegetation
	mp-b	Surface regrading and Surface revegetation
Westmoreland-14	HU-1	Daylighting deep mines, Surface regrading, and Surface revegetation
	MP-5A	Daylighting deep mines, Surface regrading, and Surface revegetation
Westmoreland-15	SLK-GW-27	Daylighting deep mines, Surface regrading, and Surface revegetation
Westmoreland-16	mp-8	Construction of special water handling facilities, Daylighting deep mines, and Surface revegetation
Westmoreland-17	SW18	Other (see comment field), Surface regrading, and Surface revegetation
Westmoreland-18	1	Construction of special water handling facilities, Daylighting deep mines, Special handling of acid-forming material, Surface regrading, and Surface revegetation

Permit ID	Monitoring Point ID	BMPs Applied
	2	Construction of special water handling facilities, Daylighting deep mines, Special handling of acid-forming material, Surface regrading, and Surface revegetation
	3	Construction of special water handling facilities, Daylighting deep mines, Special handling of acid-forming material, Surface regrading, and Surface revegetation
Westmoreland-19	MP16	Daylighting deep mines
	MP5	Daylighting deep mines
	MP6	Daylighting deep mines
Westmoreland-20	mp-7	Construction of special water handling facilities, Daylighting deep mines, Surface regrading, and Surface revegetation
Westmoreland-21	MP3	Daylighting deep mines
Westmoreland-22	103	Alkaline redistribution from on-site sources, Special handling of acid-forming material, Surface regrading, and Surface revegetation
	69	Alkaline redistribution from on-site sources, Special handling of acid-forming material, Surface regrading, and Surface revegetation
	mp-13	Alkaline redistribution from on-site sources, Special handling of acid-forming material, and Surface revegetation
	mp-16	Alkaline redistribution from on-site sources, Special handling of acid-forming material, Surface regrading, and Surface revegetation

**Appendix C: Interstate Mining Compact Commission  
Solicitation Sheet Response Summary**



## **Interstate Mining Compact Commission Solicitation Sheet**

### **Summary of Responses Received from 20 States**

Prepared by DynCorp, I & ET

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On September 3, 1998, the Interstate Mining Compact Commission distributed a Solicitation Sheet to member states in support of continuing efforts to collect data and information required for proposal of a remining subcategory under 40 CFR 434. The Solicitation Sheet was intended to gather information required to assess current industry remining activity and potential. The Solicitation also was intended to target sources of data and information available for the development of BMP guidance.

Twenty-two responses from twenty states have been received, and are summarized in the tables included in this Appendix. The information has been used to develop a profile of the remining industry, determine the potential for remining activity, and provide an indication of the types and efficiencies of BMPs currently being implemented during remining operations.

Specific questions that were included in the solicitation are outlined below:

- 1) Types of remining permits issued: Number of traditional Rahall permits  
Number of non-Rahall remining permits  
Other remining-type projects  
% total permits characterized as remining  
State's definition of "Remining"  
State's interpretation of "Pre-existing discharge"

2) Characteristics of remining operations:

Coal refuse piles, surface mines, underground mines

Permits with discharges not meeting BAT standards

Geographic distribution of remining sites

Recent remining permit issuance (12 months)

3) Characteristics of potential remining operations: coal refuse piles, surface mines, underground mines, discharges

4) Range of BMPs used in remining operations

5) Indication of available data or information regarding implementation of BMPs

6) Indication of state's experience with BMPs in terms of success or failure

7) Stream miles impacted by abandoned mine drainage

8) Industry profile of remining operations: mining companies, employees, annual production, potential coal reserves for remining

**Question 1. What type of remining permits have been approved in your state?**

Question	Responses by State																Totals							
	AK	AL	CO	IL	IN	KY(1) (SMRE)	KY(2) (CWA)	MD	MO	MS(1) (CWA)	MS(2) (SMCRA)	MT	ND	NM	OH	PA		TN	TX	UT	VA	WV	WY	
1a. Number of traditional Rehall (Sec. 301(p) of CWA) permits issued.	0	71	0	0	0	4	4	2	0	0	0	0	0	0	3	300	0	0	0	0	3	8	8	391
1b. Number of non-Rehall (i.e. those that pre-date Rehall or those where the operator accepts liability for discharges and is meeting BAT) remining permits issued.	0	?	0	41	1	N/A	?	21	20	0	0	0	0	0	?	40	350-450	0	0	0	158	0	0	631-731
1c. Other remining-type projects (e.g. AML) or permits issued. Please specify the nature of these "other" projects or permits:	0	1	15	0	1	1	1	0	0	0	0	14	0	0	100M	3	0	0	0	0	501	1	1	638
1d. What percentage of your total permits/inspectable units would be characterized as "remining permits."	0	?	0	0	1	40	?	30	150	0	0	0	0	0	60-70	95/50	60	0	0	0	75-80	0.4	0.4	---

Information reported as submitted by State.  
 See additional footnotes (attached).  
 N/A = Not applicable.  
 ? = Unknown  
 --- = No response.

Footnotes for Question 1 Summary Table:

<b>Question 1c. Additional Footnotes</b>	
(a)	AL Blue Creek Project (North Johns Area)
(b)	CO Coal refuse pile stabilization - 1983 - present; Surface mined areas- Overburden/Highwalls
(c)	IN The one accepting liability and maintaining compliance in affected area, runoff is carbon extraction from a pre-SMCRA slurry pond. The other is remining an area of abandoned and forfeited interim permits for deeper coal seams.
(d)	KY An AML project for the re-processing and reclamation of a 200 acre coal waste disposal site.
(e)	KY An AML project for the reclamation of a 200 acre coal waste disposal site.
(f)	MT (1) coal mining permits and (3) bond forfeiture permits.
(g)	OH 100 - 75 no cost contracts, 25 direct negotiated contracts with states. 1 - FGD-by-product application at an abandoned coal mine in Cosocon County where an ungerground mine seal was installed.
(h)	PA No cost contract (1); Mine fires (2).
(i)	TN All remining operations have been SMCRA permits.
(j)	VA Underground, Loading facilities, AML Projects, Refuse Piles
(k)	WV Unencountered discharge. Company dewatering a mine pool, that has a pre-existing discharge, to access their mine reserves.
<b>Question 1d. Additional Footnotes</b>	
(l)	MO Of the 55 permits which still retain some level of reclamation liability in Missouri, approximately 15% could be characterized as "remining permits" as per our earlier definition.
(m)	PA <i>Earlier definition: "remining permit" as any surface mining permit which includes at least some "previously mined areas" within the permit boundaries, regardless of whether or not the permittee intends to extract coal from those previously mined areas</i> Anthracite 95%; Bituminous 50 %

**Question 1e. Does your definition of remining differ from that set forth in the cover memo to the solicitation? If so, please explain. (See cover memo definition below).**

State	Response
AK	No.
AL	Unknown.
CO	No response.
IL	Illinois deals with "remining" by including all previously disturbed areas into our Title V program. Permits that include previously disturbed areas must meet all applicable performance standards.
IN	We concur with the definitions presented but would also include remining of SMCRA-regulated sites that had been abandoned prior to completion of reclamation obligations.
KY(1)	The DSMRE remining definition mirrors the Federal definition. For KY Pollutant and Discharge Elimination System (KPDES) issuance, the definition is the same as the Rahall Amendment definition.
KY(2)	For purposes of KPDES permit issuance, the definition of remining is the Rahall Amendment definition.
MD	No.
MO	Land Reclamation Program will define "remining permit" as any surface mining permit which includes at least some "previously mined areas" within the permit boundaries, regardless of whether or not the permittee intends to extract coal from those previously mined areas.
MS(1)	MS currently does not have a definition for "remining."
MS(2)	No.
MT	"Remining" means conducting surface coal mining and reclamation operations that affect previously mined areas (for example, the recovery of additional mineral from existing gob or tailings piles)
ND	No Response.
NM	None.
OH	It includes mining and reclamation.
PA	No.
TN	No.
TX	No.
UT	Zero.
VA	No.
WV	NPDES Program uses the Rahall Amendment.
WY	No Response.

Information reported as submitted by State.

*Cover memo definition:*

*The remining regulations promulgated by OSM define remining as "conducting surface coal mining and reclamation operations which affect previously mined areas." (30CFR 701.5) "Previously mined area, in turn, is defined as "land previously mined on which there no surface coal mining operations subject to the standards of the [Surface Mining Control and Reclamation] Act." Remining as defined in the 1987 Rahall Amendment to the Clean Water Act refers to "a coal mining operation which begins after the enactment of [Rahall Amendment] at a site on which coal mining was conducted before the effective date of the Surface Mining Control and Reclamation Act of 1977."*

*Remining can also be defined specifically as the surface mining of abandoned surface and/or underground mines that originally created and continue to discharge waters that fail to meet the applicable effluent standards. Remining permits integrate pollution abatement procedures within the operation plans and operations are designed and conducted to preclude further water quality degradation, with the intent to improve the pre-existing water quality. Alternate effluent limits for pre-existing discharge, based primarily on background water quality and quantity, are established for monitoring operations. Remining should result in an improvement in water quality operations and the inherent abatement programs.*



**Question 1f. How does your state interpret the term "pre-existing discharge"? (See cover memo definition below).**

State	Response
AK	None.
AL	No response.
CO	No response.
IL	There are no variances granted because of pre-existing non-complying discharges. Any non-complying discharge from coal mine areas, mined before Aug 2, 1977, for which there is no continuing legal responsibility under Indiana Coal regulatory programs.
IN	For KPDES permit issuance, pre-existing discharges are those discharges emanating from a potential remining site prior to any disturbance. For DSMRE permit issuance, the term is interpreted the same as the definition of remining.
KY(1)	Pre-existing discharges are those discharges coming from a potential remining site prior to any disturbance.
KY(2)	Same as Rahall Amendment
MD	Neither the Land Reclamation Program (LRP) nor the Water Pollution Control Program (WPCP) of Missouri's DNR have a specific definition for the term "pre-existing discharge" in their rules or statutes.
MS(1)	There is no interpretation of "pre-existing discharge."
MS(2)	No response.
MT	No definition.
ND	No response.
NM	None.
OH	Means a discharge from surface or subsurface water which is located on previously mined areas prior to B-3-77.
PA	Discharge from abandoned mine lands having the chemical characteristics of mine drainage, which does not meet BAT effluent limits and will be affected by new mining operation.
TN	Any discharge prior to permit application.
TX	No remining applications have been filed, therefore the Railroad Commission has not had the opportunity to interpret the term "pre-existing discharge."
UT	None.
VA	A discharge that was created by mining prior to August 3, 1977.
WV	Means any discharge the time of permit application under this subsection 301(p) of the Federal Clean Water Act. A pre-existing discharge may originate from within the coal remining operation or from outside the coal remining operation provided there is a demonstration of hydrological connection between the coal remining operation and the pre-existing discharge.
WY	No response.

Information reported as submitted by State.  
Cover memo definition:

*"Pre-existing discharges" as defined in the Rahall Amendment refers to any "discharge at the time of permit application under [the Rahall Amendment]." Alternatively, pre-existing discharges may be defined as pollutional discharges resulting from previous mining and not encountered during active mining operations.*



Question 2a. With regard to the permits identified in question 1, what are the characteristics of your state's existing remining operations? If exact numbers are unknown, please provide estimates.

State	Number of coal refuse piles			Number of surface mined sites			Number of underground mined sites			Number of remining permits that involve discharges not meeting BAT standards		
	Active Mines	AML Projects		Active Mines	AML Projects		Active Mines	AML Projects		Active Mines	AML Projects	
		Under Permit	Projects		Under Permit	Projects		Under Permit	Projects		Under Permit	Projects
AK	0	0	0	0	0	0	0	0	0	0	0	0
AL	4	1	54	--	--	13	--	--	?	?	?	1
CO	0	4	0	12	0	0	2	0	0	0	0	0
IL	40	0	1	0	0	0	0	0	0	0	0	0
IN	1	0	34	--	--	2	--	--	0	0	0	--
KY(1-SMRE)	--	--	--	--	--	--	--	--	--	--	--	--
KY(2-CWA)	3	1	1	1	--	2	--	--	5	5	5	--
MD	0	--	17	--	--	21	--	--	2	2	2	--
MO	0	0	2	0	0	0	0	0	0	0	0	0
MS(1-CWA)	0	0	1	0	0	0	0	0	0	0	0	0
MS(2-SMCRA)	0	0	0	0	0	0	0	0	0	0	0	0
MT	1	--	11	1	--	1	--	--	0	0	0	--
ND	--	--	--	--	--	--	--	--	--	--	--	--
NM	0	0	0	0	0	0	0	0	0	0	0	0
OH	0	--	2	1	1	1	--	--	0	0	0	--
PA	173	0	1278*	0	0	655	2	616	616	616	616	0
TN	5 to 10	0	135 - 180	0	0	210 - 260	0	0	0	0	0	0
TX	0	0	0	0	0	0	0	0	0	0	0	0
UT	5	0	2	0	0	32	N/A	0	0	0	0	N/A
VA	33	38	77	117	104	107	104	104	0	0	0	2
WV	1	--	7	--	--	1	--	--	9	9	9	--
WY	--	--	--	--	--	--	--	--	--	--	--	--
<b>Totals</b>	<b>266 - 271</b>	<b>44</b>	<b>1622 - 1667</b>	<b>130</b>	<b>1045 - 1095</b>	<b>108</b>	<b>108</b>	<b>632</b>	<b>632</b>	<b>632</b>	<b>632</b>	<b>3</b>

Information reported as submitted by State.

? = Unknown.  
 -- = No response.  
 N/A = Not Applicable.  
 \* With remining.

Question 2b and 2c.

State	2b. How are your remining sites distributed geographically throughout your state (by region, coalfield, etc.)?	2c. How many active remining sites have been permitted in the last 12 months (if available)?
AK	N/A	0
AL	Both	8
CO	All coal fields are affected.	0
IL	70% in Southern IL	1
IN	SW part of state is coal region.	0
KY(1-SMRE)	There are 2 coalfields in KY; Eastern & Western. Remining occurs in both regions, extensively in Eastern.	--
KY(2-CWA)	All are in the Hopkins & Webster Counties in the Western KY coalfields.	1
MD	Majority located in Allegany Co., Georges Creek area. Historically, sites were located in the North Central and Southwest parts of MO. All remining "active" sites are in Southwest MO.	2
MO	This issue is not addressed. MS might list sites by county or region.	1
MS(1-CWA)	No previously mined sites exist.	0
MS(2-SMCRA)	Region.	0
MT	No response.	0
ND	No remining sites in NM.	--
NM	Eastern 1/3 of Ohio affected.	N/A
OH	See attached map for distribution of "Rahall" sites.	0
PA	Non-Rahall remining sites are distributed evenly throughout the TN coalfield (Cumberland Plateau).	--
TN	No remining sites currently identified.	4
TX	Utah minesites are located in two major coalfields; the Book Cliffs and Wasatch.	0
UT		0
VA	All (3 Rahall) are located within one area of the coalfields (Wise County).	16
WV	Northern coalfields.	3
WY	N/A	--
<b>Total</b>		<b>36</b>

Information reported as submitted by State.  
N/A = Not Applicable.

**Question 3. What are the characteristics of your state's potential remining operations?  
If exact numbers are unknown, please provide best estimates. Numbers  
can be drawn from AMLIS or other sources.**

State	Number of coal refuse piles	Number of surface mined sites	Number of underground mined sites	Number of Permits that involve discharges not meeting BAT
AK	3	5	1	1
AL	1	--	--	1
CO	400	50	850	<5
IL	30	10	12	0
IN	150	453	615	0
KY(1-SMRE)	200	400-600	800-1000	--
KY(2-CWA)	?	?	?	?
MD	10	75	75	50
MO	0	0	0	0
MS(1-CWA)	0	1	0	0
MS(2-SMCRA)	0	0	0	0
MT	1	11	1	0
ND	--	--	--	--
NM	N/A	N/A	N/A	N/A
OH	1,095 acres	23,000 acres	4,000	0
PA	858	19,128 (a)	8,683 (b)	230
TN	182 acres	46,000 acres	800	?
TX	0	0	0	0
UT	5	2	32	0
VA	400-450	750	800	0
WV	--	3	--	All
WY	0	0	0	?
<b>Totals</b>	<b>2,058-2,108 and 1,277 Acres</b>	<b>1,760-1,960 and 227,960 Acres</b>	<b>7,986-8,186 and 31,587 Acres</b>	<b>287</b>

Information reported as submitted by State.

-- = No Response.

N/A = Not Applicable.

? = Unknown.

(a) 19,128 Features (158,960 Acres).

(b) 8,683 Features ( 31,587 Acres).



**Question 4. Using the following list and chart, please indicate the range of best management practices that have been employed in remining permits or in other mining applications in your state. Also, if available, please provide the number of BMPs employed, indicating the number used at active remining sites, those used in other mining applications (e.g., AML projects).**

		4a. Whether Employed														Totals										
		AK	AL	CO	IL	IN	KY (1) (SMRE)	KY (2) (CWA)	MD	MO (CWA)	MS (1) (CWA)	MS (2) (SMCRA)	MT	ND	NM	OH	PA	TN	TX	UT	VA	WV	WY	(Y/N)		
<b>I. Hydrologic BMP's</b>																										
<b>A. Exclusion of Infiltrating Surface Water</b>																										
1. Diversion Ditches																										
	a. Above highwell	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	6/1
	b. On the spoil	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N/A
2. Regrading of dead spoils																										
	a. Elimination of closed contour depressions & pits	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	11/3
	b. Creation of sufficient slopes to aid runoff of precip.	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N/A
3. Lowpermeability caps																										
	a. Clays & other natural materials	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	10/4
	b. Coal combustion wastes	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	9/1
	c. Cement, bentonite & sim. materials	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	11/4
	d. Geotextiles	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	4/6
<b>B. Exclusion of Infiltrating Ground Water</b>																										
1. Grout Curtains																										
	a. Above the highwell	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	9/4
	b. At the highwell	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	7/5
	i. Sym-reclamation	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	6/5
	ii. Post reclamation	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	5/7
2. Diversion Wells																										
	a. Above the highwell	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	2/4
	b. At the highwell	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N/A
	c. Horizontal wells	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	1/7
	i. Sym-reclamation	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	2/7
	ii. Post reclamation	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	0/6
3. Highwell Drains																										
	a. Horizontal	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	0/7
	b. Chimney drains	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	1/8
	c. Pit floor drains	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	3/7
	a. Linear (directly down dip)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	3/7
	b. Forked or dendritic	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	0/9
4. Highwell Drains																										
	a. Horizontal	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	3/5
	b. Chimney drains	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	4/6
	c. Pit floor drains	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	3/7
	a. Linear (directly down dip)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	4/6
	b. Forked or dendritic	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	7/4
5. Daylighting (surf. mining of aband. undergr. mine work)																										
	a. Redirecting water from aband. undergr. mine workings	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	1/8
	b. Sealing underground workings	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	8/6
	a. Installation of drains directly from underground mines	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	4/6
	b. Sealing of auger holes	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	7/5
	c. Sealing of auger holes	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	7/4

4a. Whether Employed

	AK	AL	CO	IL	IN	KY (1) (SMRE)	KY (2) (CWA)	MD	MO	MS(1) (CWA)	MS(2) (SMCRA)	MT	ND	NM	OH	PA	TN	TX	UT	VA	WV	WY	Totals (Y/N)	
7. Sealing of underground mine entries (via flooding)	--	Y	N	Y	N	N	--	N	N	N/A	N/A	ftd	--	--	N	Y	N	--	--	Y	N	N/A	4/8	
8. Hydrologic routing of ground water	--	N	--	N	N	Y	--	N	N	--	N/A	N	--	--	N	--	--	--	--	Y	Y	N/A	3/6	
a. Grouting	--	--	N	N	N	N	--	--	N	N/A	N/A	N	--	--	--	N	N	--	--	Y	N	N/A	1/10	
b. Limestone Drains	--	--	Y	N	N	Y	--	--	N	N/A	N/A	N	--	--	--	Y	Y	--	--	Y	Y	N/A	6/5	
c. Pit floor sealing	--	N	N	N	N	N	--	--	N	N/A	N/A	N	--	--	--	Y	N	--	--	--	Y	N/A	2/8	
9. Construction of high-water retention soils	--	N	N	N	N	N	--	N	N	N/A	N/A	N	--	--	N	?	N	--	--	--	Y	N/A	0/12	
C. Other	--	--	Y	--	N	N	--	--	N	N/A	N/A	--	--	--	--	--	N	--	--	--	N	N/A	1/4	
<b>II. Geochemical</b>																								
A. Alkaline addition-strategic placement	--	Y	--	--	Y	Y	--	--	N	--	N/A	N	--	--	Y	--	--	--	--	--	Y	N/A	5/2	
1. Lim estone or calcareous shales	--	Y	Y	Y	Y	Y	--	N	N	Y	N/A	N	--	--	Y	--	Y	--	--	--	Y	N/A	9/3	
2. Coal combustion wastes	--	--	N	Y	Y	N	--	Y	N	N/A	N/A	N	--	--	Y	Y	Y	--	--	--	Y	N/A	7/5	
3. Others	--	--	--	--	--	N	--	--	N	--	N/A	--	--	--	--	--	N	--	--	--	--	N/A	0/4	
B. Induced Alkaline recharge	--	--	--	--	N	N	--	--	N	--	N/A	N	--	--	N	--	--	--	--	--	Y	N/A	1/5	
1. Trenches	--	N	Y	N	--	--	--	--	N	N/A	N/A	N	--	--	Y	Y	Y	--	--	--	N	N/A	3/6	
2. Carrudio-like tunnels	--	--	N	N	N	--	--	--	N	N/A	N/A	N	--	--	--	N	N	--	--	--	Y	N/A	0/9	
C. Special handling of AFMs	--	Y	--	--	Y	Y	--	--	N	--	N/A	N	--	--	N	Y	--	--	--	--	Y	N/A	6/3	
1. Above postmining water table	--	--	N	Y	Y	Y	--	Y	N	Y	N/A	N	--	--	--	Y	Y	--	--	Y	Y	N/A	9/3	
2. Removed from potential ground water flow path	--	Y	N	Y	Y	Y	--	N	N	Y	N/A	N	--	--	--	N	Y	--	--	Y	Y	N/A	8/5	
D. Anionic Surfactants	--	Y	N	--	N	N	--	N	N	N/A	N/A	N	--	--	--	N	Y	--	--	Y	N	N/A	3/9	
E. Other	--	--	--	--	--	--	--	--	N	--	N/A	--	--	--	--	--	N	--	--	Y	N	N/A	1/3	
<b>III. Revegetation</b>																								
A. Runoff promoting plants	--	--	N	--	N	N	--	N	N	Y	N/A	N	--	--	--	N	N	--	--	N	N/A	2/10		
B. High water-use plants	Y	--	N	--	N	N	--	N	N	Y	N/A	N	--	--	--	Y	N	--	--	--	N	N/A	3/8	
C. Use of biosolids	--	--	N	--	Y	Y	--	N	N	Y	N/A	Y	--	--	--	Y	Y	--	--	--	N	N/A	5/5	
D. Other	--	--	--	--	--	N	--	--	N	N/A	N/A	--	--	--	Y	--	N	--	--	--	N	N/A	1/5	
<b>IV. Passive Treatment</b>																								
A. Anoxic limestone drains installed in backfill	--	Y	N	Y	Y	Y	--	N	N	N/A	N/A	N	--	--	N	Y	Y	--	--	Y	Y	N/A	8/6	
B. Constructed wetlands	--	Y	Y	Y	Y	Y	--	Y	Y	Y	N/A	N	--	--	N	Y	Y	--	--	Y	N	N/A	10/3	
C. SAPS	--	--	--	--	N	N	--	N	?	N/A	N/A	?	--	--	N	Y	Y	--	--	Y	N	N/A	2/6	
D. Open limestone trenches	--	Y	N	N	Y	Y	--	N	Y	N	N/A	N	--	--	Y	Y	Y	--	--	Y	N	N/A	7/7	
E. Vat's manganese oxide system	--	--	N	N	N	N	--	Y	N	N/A	N/A	?	--	--	N	Y	Y	--	--	--	N	N/A	3/8	
F. Other	--	--	--	N	--	N	--	--	N	N/A	N/A	--	--	--	--	Y	N	--	--	--	N	N/A	1/6	
<b>V. Geotechnical</b>																								
A. Elimination of landslides	--	--	--	--	N	Y	--	Y	N	N/A	N/A	N	--	--	N	Y	--	--	--	Y	Y	N/A	5/5	
1. Regrading for slope stabilization	Y	--	Y	Y	Y	Y	--	Y	N	N/A	Y	--	--	Y	Y	Y	Y	--	--	Y	Y	N/A	11/3	
2. Installation of key-ways	Y	--	Y	Y	N	Y	--	Y	N	N/A	Y	--	--	--	N	Y	N	--	--	Y	N	N/A	7/6	
B. Other	--	--	--	--	--	R	--	--	N	--	N/A	--	--	--	--	--	N	--	--	--	N	N/A	0/3	

Information reported as submitted by State.  
 -- = No Response.  
 ftd = To be done.  
 N/A = Not Applicable.  
 R = Retaining Walls.

4b. Number of (Active) Remaining Sites

	AK	AL	CO	IL	IN	IA	KS	KY(1)	KY(2)	MD	MO	MS(1)	MS(2)	MT	ND	NM	OH	PA	TN	TX	UT	VA	WV	WY	Totals
<b>I. Hydrologic BMPs</b>																									
A. Exclusion of Infiltrating Surface Water																									
1. Diversion Ditches																									
a. Above highwell		71	0	0	2																				
b. On the spoil																									
2. Regrading of dead spoils																									
a. Elimination of closed contour depressions & pits																									
b. Creation of sufficient slopes to aid runoff of precip.																									
3. Lowperm seability caps																									
a. Clays & other natural materials																									
b. Coal combustion wastes																									
c. Cement, bentonite & sim. materials																									
d. Geotextiles																									
B. Exclusion of Infiltrating Ground Water																									
1. Groud Curtains																									
a. Above the highwell																									
b. At the highwell																									
c. Horizontal wells																									
3. Highwell Drains																									
a. Horizontal																									
b. Chimney drains																									
4. Pit floor drains																									
a. Linear (directly down dip)																									
b. Forked or dendritic																									
5. Daylighting (surf. mining of aband. undergr. mine workin			13	0	0																				
6. Redirecting water from aband. undergr. mine workings																									
a. Sealing underground workings																									
b. Installation of drains directly from underground mines																									
c. Sealing of auger holes																									
7. Sealing of underground mine entries (via flooding)																									
8. Hydrologic routing of ground water																									
a. Grouting																									
b. Limestone Drains																									
c. Pit floor sealing																									
9. Construction of high-water retention soils																									
C. Other																									
<b>II. Geochemical</b>																									
A. Alkaline addition-strategic placement																									
1. Limestone or calcareous shales																									
2. Coal combustion wastes																									
3. Others																									
B. Induced Alkaline recharge																									
1. Trenches																									
2. Carrud-like tunnels																									
C. Special handling of AFMs																									
1. Above postmining water table																									

4b. Number of (Active) Remining Sites

	AK	AL	CO	IL	IN	KY (1) (SMRE)	KY (2) (CWA)	MD	MO	MS (1) (CWA)	MS (2) (SMCRA)	MT	ND	NM	OH	PA	TN	TX	UT	VA	WV	IWV	Totals
2. Removed from potential ground water flow path	--	5	0	0	--	--	--	0	0	N/A	N/A	--	--	--	--	0	Unk.	--	0	16	7	0	28
D. Anionic Surfactants	--	1	0	--	--	--	--	0	0	N/A	N/A	--	--	--	--	0	Unk.	--	0	--	--	0	1
E. Other	--	--	0	--	--	--	--	0	0	N/A	N/A	--	--	--	--	--	Unk.	--	0	7	--	0	7
<b>III. Revegetation</b>	--	--	0	--	--	--	--	0	0	N/A	N/A	--	--	--	--	--	Unk.	--	0	--	8	0	8
A. Runoff promoting plants	--	--	0	--	--	--	--	0	0	N/A	N/A	--	--	--	--	0	Unk.	--	0	3	--	0	3
B. High water-use plants	--	--	0	--	--	--	--	0	0	N/A	N/A	--	--	--	--	0	Unk.	--	0	--	--	0	0
C. Use of biosolids	--	--	0	--	--	--	--	0	0	N/A	N/A	--	--	--	--	Some	Unk.	--	0	--	--	0	0
D. Other	--	--	0	--	--	--	--	0	0	N/A	N/A	--	--	--	--	--	Unk.	--	0	--	--	0	0
<b>IV. Passive Treatment</b>	--	--	0	--	--	--	--	0	0	N/A	N/A	--	--	--	--	--	Unk.	--	0	Y	1	0	1
A. Anoxic limestone drains installed in backfill	--	1	0	0	--	--	--	0	0	N/A	N/A	--	--	--	--	Few	Unk.	--	0	3	1	0	5
B. Constructed wetlands	--	2	0	0	--	--	--	0	0	N/A	N/A	--	--	--	--	Some	Unk.	--	0	2	--	0	4
C. SAPS	--	--	0	--	--	--	--	0	0	N/A	N/A	--	--	--	--	Few	Unk.	--	0	--	--	0	0
D. Open limestone trenches	--	2	0	0	--	--	--	0	0	N/A	N/A	--	--	--	--	Few	Unk.	--	0	7	--	0	9
E. Vail's manganese oxide system	--	--	0	0	--	--	1	0	0	N/A	N/A	--	--	--	--	Few	Unk.	--	0	--	--	0	1
F. Other	--	--	0	0	--	--	--	0	0	N/A	N/A	--	--	--	--	Few	Unk.	--	0	--	--	0	0
<b>V. Geotechnical</b>	--	--	0	--	--	--	--	0	0	N/A	N/A	--	--	--	--	--	Unk.	--	0	Y	8	0	8
A. Elimination of landslides	--	--	0	--	--	--	2	0	0	N/A	N/A	--	--	--	--	0	Unk.	--	0	15	8	0	25
1. Regrading for slope stabilization	--	--	0	0	--	--	15	0	0	N/A	N/A	--	--	--	--	0	Unk.	--	0	15	8	0	38
2. Installation of key ways	--	--	0	0	--	--	1	0	0	N/A	N/A	--	--	--	--	0	Unk.	--	0	9	--	0	10
B. Other	--	--	0	--	--	--	--	0	0	N/A	N/A	--	--	--	--	--	Unk.	--	0	--	--	0	0

Information reported as submitted by State.

N/A = Not Applicable.

Unk = Unknown.

-- = No Response.

		4c. Number of other Mining Applications																							
		AK	AL	CO	IL	IN	KY (1) (SMRE)	KY (2) (CWA)	MD	MO	MS(1) (CWA)	MS(2) (SMCRA)	MT	ND	NM	OH	PA	TN	TX	UT	VA	WV	WY	Totals	
I.	Hydrologic BMPs																								
A.	Exclusion of Infiltrating Surface Water																								
1.	Diversion Ditches																								
a.	Above highwall				A																				
b.	On the spoil				A	2-5																			
2.	Regrading of dead spoils				A	2-5																			
a.	Elimination of closed contour depressions & pits				A																				
b.	Creation of sufficient slopes to aid runoff of precip.				A																				
3.	Low-permeability caps				A																				
a.	Clays & other natural materials				A																				
b.	Coal combustion wastes				A																				
c.	Cement, bentonite & sim. materials				A																				
d.	Geotextiles				A																				
B.	Exclusion of Infiltrating Ground Water																								
1.	Grout Curtains																								
a.	Above the highwall																								
b.	At the highwall																								
i.	Syn-reclamation																								
ii.	Post reclamation																								
2.	Diversion Wells																								
a.	Above the highwall																								
b.	At the highwall																								
c.	Horizontal wells																								
3.	Highwall Drains																								
a.	Horizontal																								
b.	Chimney drains																								
4.	Pit floor drains																								
a.	Linear (directly down dip)																								
b.	Forked or dendritic																								
5.	Daylighting (surf. mining of aband. undergr. mine workings)																								
6.	Redirecting water from aband. undergr. mine workings																								
a.	Sealing underground workings																								
b.	Installation of drains directly from underground mines																								
c.	Sealing of auger holes																								
7.	Sealing of underground mine entries (via flooding)																								
8.	Hydrologic routing of ground water																								
a.	Grouting																								
b.	Limestone Drains																								
c.	Pit floor sealing																								
9.	Construction of high-water retention soils																								
C.	Other																								
A.	Alkaline addition-strategic placement																								

4c. Number of other Mining Applications																							
	AK	AL	CO	IL	IN	KY (1) (SMRE)	KY (2) (CWA)	MD	MO	MS(1) (CWA)	MS(2) (SMCRA)	MT	ND	NM	OH	PA	TN	TX	UT	VA	WV	WY	Totals
1. Limestone or calcareous shales	--	0	1	A	Several	--	--	0	1	N/A	--	--	--	--	1	0	0	0	0	--	--	Unk.	2
2. Coal combustion wastes	--	0	0	A	2	--	--	0	1	N/A	--	--	--	--	1	0	0	0	0	--	--	Unk.	4
3. Others	--	0	0	--	--	--	--	0	1	N/A	--	--	--	--	--	--	0	0	0	--	--	Unk.	1
B. Induced Alkaline recharge	--	0	0	A	--	--	--	0	1	N/A	--	--	--	--	--	Few	0	0	0	--	--	Unk.	1
1. Trenches	--	0	0	--	--	--	--	0	1	N/A	--	--	--	--	--	--	0	0	0	--	--	Unk.	1
2. Carrucio-like funnels	--	0	0	--	--	--	--	0	1	N/A	--	--	--	--	--	Most	0	0	0	--	--	Unk.	1
C. Special handling of AFMs	--	0	0	A	Several	--	--	0	1	N/A	--	--	--	--	Most	0	0	0	0	5	--	Unk.	6
1. Above postmining water table	--	0	0	A	1-3	--	--	0	1	N/A	--	--	--	--	0	0	0	0	0	2	--	Unk.	3
2. Removed from potential ground water flow path	--	0	0	--	--	--	--	0	1	N/A	--	--	--	--	0	0	0	0	0	--	--	Unk.	1
D. Anionic Surfactants	--	0	0	--	--	--	--	0	1	N/A	--	--	--	--	--	--	0	0	0	--	--	Unk.	1
E. Other	--	0	0	--	--	--	--	0	1	N/A	--	--	--	--	--	--	0	0	0	--	--	Unk.	1
<b>III. Revegetation</b>	--	0	0	--	--	--	--	0	1	N/A	--	--	--	--	--	0	0	0	0	--	--	Unk.	1
A. Runoff promoting plants	--	0	0	--	--	--	--	0	1	N/A	--	--	--	--	--	0	0	0	0	--	--	Unk.	1
B. High water-use plants	--	0	0	--	--	--	--	0	1	N/A	--	--	--	--	Some	0	0	0	0	--	--	Unk.	1
C. Use of biosolids	--	0	0	--	6-8	--	--	0	1	N/A	--	--	--	--	0?	0	0	0	0	--	--	Unk.	8-10
D. Other	--	0	0	--	--	--	--	0	1	N/A	--	--	--	--	1	0	0	0	0	--	--	Unk.	2
<b>IV. Passive Treatment</b>	--	0	0	--	--	--	--	0	1	N/A	--	--	--	--	--	0	0	0	0	--	--	Unk.	1
A. Anoxic limestone drains installed in backfill	--	0	0	A	3	--	--	0	1	N/A	--	--	--	--	Few	0	0	0	0	--	--	Unk.	4
B. Constructed wetlands	--	0	3	A	2	--	--	2	1	N/A	--	1	--	--	Some	0	0	0	0	5	--	Unk.	14
C. SAPS	--	0	0	--	--	--	--	0	1	N/A	--	--	--	--	Some	0	0	0	0	--	--	Unk.	1
D. Open limestone trenches	--	0	0	--	--	--	--	1	1	N/A	--	--	--	--	1	0	0	0	0	--	--	Unk.	3
E. Vail's manganese oxide system	--	0	0	--	--	--	--	0	1	N/A	--	--	--	--	Few	0	0	0	0	--	--	Unk.	1
F. Other	--	0	0	--	--	--	--	0	1	N/A	--	--	--	--	Few	0	0	0	0	--	--	Unk.	1
<b>V. Geotechnical</b>	--	0	0	--	--	--	--	0	1	N/A	--	--	--	--	--	--	0	0	0	--	--	Unk.	1
A. Elimination of landslides	--	0	0	--	--	--	--	0	1	N/A	--	--	--	--	--	--	0	0	0	--	--	Unk.	1
1. Regrading for slope stabilization	--	7	A	--	--	--	--	0	1	N/A	--	Y	--	--	1	Most	0	0	0	50	--	Unk.	59
2. Installation of key ways	--	1	A	--	--	--	--	0	1	N/A	--	10	--	--	0	0	0	0	0	--	--	Unk.	12
B. Other	--	0	0	--	--	--	--	0	1	N/A	--	--	--	--	--	--	0	0	0	--	--	Unk.	1
Information reported as submitted by State.																							
-- = No Response.																							
N/A = Not Applicable.																							
Unk. = Unknown.																							
A = Active mining.																							

Question 5. Do you have the following data and information on the above described (remining) permits:

	Response by State (Y = Yes, N = No)																					
	AK	AL	CO	IL	IN	SMRE	IA	MD	MO	CWA	MS	MT	ND	NM	OH	PA	TN	TX	UT	VA	WV	WY
BMP Performance Information (Success/Failures)	N	N	Y	N	N	Y*	N	N	N	N	N/A	N	--	--	Y	Y	N	N	--	Y	Y	N/A
Description of BMP	N	Y	Y	N	N	Y*	N	N	N	Y	N/A	N	--	--	Y	Y	Y	N	--	Y	Y	N/A
BMP Abatement plan info.	N	Y	Y	N	N	N	N	N	N	N	N/A	N	--	--	Y	Y	Y	N	--	Y	Y	N/A
BMP Cost Information	N	N	Y	N	Y*	Y*	N	N	N	N	N/A	N	--	--	Y	Y	Y	N	--	Y	Y	N/A
Geologic information	N	Y	Y	Y	Y*	Y*	N	Y	N	Y	N/A	Y	--	--	Y	Y	Y	--	Y	Y	Y	N/A
Hydrologic information																						
Background monitoring reports	N	--	Y	Y	Y	Y	Y	Y	Y	Y	N/A	Y	--	--	Y	Y	Y	--	Y	Y	Y	N/A
Chemical analysis	N	--	Y	Y	Y	Y	Y	Y	Y	Y	N/A	Y	--	--	Y	Y	Y	--	Y	Y	Y	N/A
Ground water info.	N	--	N	Y	Y	Y	N	Y	N	Y	N/A	Y	--	--	Y	Y	Y	--	Y	Y	Y	N/A
Surface water info.	N	--	S	Y	Y	Y	Y	Y	Y	Y	N/A	Y	--	--	Y	Y	Y	--	Y	Y	Y	N/A
Public water supply info.	N	--	N	Y	N	P*	Y	Y	N	Y	N/A	Y	--	--	N	Y	Y	--	Y	Y	Y	N/A
Hydrologic assessment	N	--	Y	Y	N	Y	N	Y	N	Y	N/A	Y	--	--	Y	Y	Y	--	Y	Y	Y	N/A
Baseline pollution load analysis & data	N	Y	N	Y	N	Y	Y	Y	N	N	N/A	Y	--	--	N	Y	Y	--	Y	Y	Y	N/A
Impact statistics (acres affected, reclaimed, etc.)	N	--	Y	Y	N	Y*	N	Y	Y	Y	N/A	Y	--	--	N	Y	Y	--	Y	Y	Y	N/A
Environmental assessment	N	--	S	Y	N	Y	N	Y	Y	Y	N/A	Y	--	--	N	Y	Y	--	Y	Y	Y	N/A
Operational info. (Reclamation/Operation descript.)	N	Y	S	Y	Y	Y	N	Y	N	Y	N/A	Y	--	--	N	Y	Y	--	Y	Y	Y	N/A
Revegetation info. (Temporary & Permanent cover)	N	Y	S	Y	Y	Y	N	Y	Y	Y	N/A	Y	--	--	N	Y	Y	--	Y	Y	Y	N/A
Topographic maps	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	N/A	Y	--	--	Y	Y	Y	--	Y	Y	Y	N/A
Program guidance regarding remaining and or implementation	N	--	Unk.	N	N	Y	N	N	N	Y	N/A	N	--	--	N	Y	Y	--	Y	Y	Y	N/A
BMP inspection information	N	--	Y	N	N	Y	N	N	N	Y	N/A	N	--	--	N	S	Y	--	Y	Y	N	N/A
Verification of BMP implementation info.	N	--	Unk.	N	Y	--	N	N	N	Y	N/A	N	--	--	N	S	Y	--	Y	Y	N	N/A

Information reported as submitted by State.  
 Y\* = AML only  
 P\* = Partial (AML only)  
 S = Some  
 D = Drainage proposal maps  
 C = Comprehensive Hydrologic Impact Assessment (CHIA).  
 N/A = Not Applicable  
 -- = No Response  
 Unk = Unknown



Question 6: What has your state's experience been with these BMPs in terms of their success or failure of implementation?

State	Response
Alaska	None.
Alabama	No response.
Colorado	Generally successful. Failures have been in some of the details which were corrected with one-time maintenance. Water treatment projects have shown limited success.
Illinois	No response.
Indiana	While several BMPs have been employed effectively they have not been allowed as an exception to normal NPDES limitations as provided by Rahall Amendment. Majority of applications have been in true AML projects and not "remining" scenarios.
Kentucky (1) - (SMRE)	Success or failure of BMPs for both Title IV and V programs is indirectly reflected in the "closure" of AML projects & the approval of complete bond releases in this state. These final actions would not occur if the above-utilized BMPs were unsuccessful.
Kentucky (2) - (CWA)	The issuance of a KPDES permit does not require specific knowledge of the types and number of these defined BMPs. Therefore, the division of Water cannot provide non quality related data.
Maryland	Just beginning to implement.
Missouri	To date the constructed wetlands have not obtained the desired water quality.
Mississippi (1) - (CWA)	Fair to good & site specific results.
Mississippi (2)	No response.
Montana	Silt fencing, bales, matting has worked well.
North Dakota	No response.
New Mexico	No response.
Ohio	Application of PFBC by-product during reclamation has proven successful. We applied 125 tons/acre of by-product, plus 50 tons/acre of yard-waste compost to the mine site. Vegetation has been established. pH of interstitial pore waters is near neutral (6.5-7.0). No elevated concentration of As, Se, Hg, or Pb were detected. However SO <sup>4</sup> + B concentration have risen, which may be of concern. (Same as Pennsylvania)
Pennsylvania	<u>Regrading of old spoils</u> : highly successful. Often will promote runoff and reduce infiltration. <u>Daylighting of deep mines</u> : successful when alkaline overburden is encountered in daylighting or surface runoff is restored. <u>Alkaline addition</u> : a mixed bag. Can work, but often there is not enough alkaline material added to be effective. <u>Special Handling</u> : can reduce acidity, but cannot produce alkaline water in the absence of calcareous materials. <u>Revegetation</u> : an unqualified success. <u>Biosolids</u> : very successful in promoting vegetation. <u>Hydrogeologic controls</u> : jury still out. We're looking at it.
Tennessee	The most successful BMPs implemented in TN are: limestone drains; surface diversions; geochemical amendments; and special handling of acid forming materials.
Texas	No response.
Utah	No response.
Virginia	Generally, when BMPs are used, we see an improvement in water quality. This can be documented through water monitoring reports that are submitted to the Division on a quarterly basis and then compared to baseline data. Only in a couple of instances did we observe no change in water quality.
West Virginia	Too early to tell.
Wyoming	BMPs have been successfully implemented. In Wyoming the primary water quality concern is with sediment. AMD problems associated with coal mining are virtually non-existent.

Information reported as submitted by State.



Question 7. Does your state maintain a listing or inventory of the number of stream miles impacted by AMD. (i.e., EPA 303(d) listing)? If available, please provide mileage.

State	Stream Miles
AK	0
AL	65
CO	Yes
IL	NA
IN	No
KY(1-SMRE)	600
KY(2-CWA)	600
MD	430
MO	52 miles classified, 87 miles unclassified
MS(1-CWA)	No
MS(2-SMCRA)	0
MT	--
ND	--
NM	0
OH	1,500
PA	3,000
TN	1,750
TX	0
UT	0
VA	No
WV	2,225
WY	0
<b>Total</b>	<b>9,709</b>

Information reported as submitted by State.

NA = Not Available.

-- = No Response.



Question 8. What is the industrial profile of your state's remining operations?  
 If exact numbers are unknown, please provide estimates.

State	Number of mining companies with remining permits	Total employment at remining operations (number of employees)	Annual coal production from remining sites (tons)	Estimated coal reserves that could be remined (tons)
AK	0	0	0	0
AL	20	Unk	Unk	Unk
CO	0	0	0	Unk
IL	35	70	200,000	10,000,000
IN	2	N/A	720,000	N/A
KY(1-SMRE)	---	---	---	---
KY(2-CWA)	4	Unk	Unk	Unk
MD	13	150	650,000	Unk
MO	2	0	0	Unk
MS(1-CWA)	0	0	0	Unk
MS(2-SMCRA)	0	0	0	0
MT	0	---	---	---
ND	---	---	---	---
NM	0	0	0	0
OH	3	Unk	Unk	Unk
PA	50	2,345	17,530,000	100,000,000 +
TN	10	75 - 100	3,000,000	50,000,000
TX	0	0	0	0
UT	0	0	0	Unk
VA	3	300	3,000,000 +	Unk
WV	8	Unk	Unk	Unk
WY	0	0	0	Unk
<b>Totals</b>	<b>150</b>	<b>2,940 - 2,965</b>	<b>25,100,000</b>	<b>160,000,000</b>

Information reported as submitted by State.

Unk = Unknown.

N/A = Not Applicable.

--- = No Response.

